

# Great Gull Island

## Southold, Suffolk County

3,700 acres  
0-25' elevation

41.2209°N  
72.1122°W

### IBA Criteria Met

Criterion	Species	Data	Season	Source
Species at Risk	Roseate Tern	Estimated 1,747 pairs in 1999, 1,690 in 1998, 1,455 in 1997, 1,064 in 1996, 1,056 in 1995, 1,138 in 1994, 1,400 in 1993	Breeding	Long Island Colonial Waterbird and Piping Plover Survey
Species at Risk	Common Tern	Estimated 10,000 pairs in 1999, 10,000 in 1998, 11,248 in 1997, 9,000 in 1996, 8,000 in 1995, 7,750 in 1994, 7,800 in 1993	Breeding	Long Island Colonial Waterbird and Piping Plover Survey
Congregations- Waterbirds	Mixed species	Has well exceeded threshold (100 ind.) over past ten years	Breeding	Long Island Colonial Waterbird and Piping Plover Survey
Congregations- Individual Species	Roseate Tern	Has supported 60-90% of Long Island population over the past ten years	Breeding	Long Island Colonial Waterbird and Piping Plover Survey
Congregations- Individual Species	Common Tern	Has supported 30-50% of Long Island population over the past ten years	Breeding	Long Island Colonial Waterbird and Piping Plover Survey

**Description:** This site includes a seven-acre rocky island covered with grassy and herbaceous vegetation (owned by the American Museum of Natural History), and the surrounding marine waters, including a deepwater channel known as “The Race.” The Race hosts large concentrations of striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), tautog (*Tautoga onitis*), and summer flounder (*Paralichthys dentatus*). It is also a major migration corridor for striped bass and supports a regionally significant commercial lobster (*Homarus americanus*) fishery.

## Birds:

This is one of the most important tern nesting sites in the world, with the largest breeding colony of Roseate Terns in North America (1,500 pairs in 1996; 45% of the northeast North American population) and one of the largest colonies of Common Terns as well (8,000 pairs in 1995, 7,750 in 1996; 40-45% of the state population). The numbers of terns during the years 2000-2004 continued to be about 10,000 Common Tern nests and roughly 1,600 Roseate Tern nests annually.

## Conservation:

This site is listed in the 2002 Open Space Conservation Plan as a priority site under the project name Long Island Sound Coastal Area. Oil spills are a potential threat to this area. A long-term research project managed by staff from the American Museum of Natural History involves the demography and life history of terns. During the first round of IBA site identifications, this site was recognized under the research criterion because of the research being performed there.

# HISTORIC RESOURCES SURVEY

## PLUM ISLAND, NEW YORK

### VOLUME 1



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## **SURVEY METHODOLOGY**

### **Objectives**

The objectives of the survey as defined in the project specifications were to "perform an Historic Resources Survey of all buildings, structures and related features on Plum Island. This survey shall follow and meet each of the steps outlined in the New York State 'Standards for the Completion of Intensive Level surveys for Projects where Reconnaissance surveys have not been Performed.'" The specifications further required that a New York State HP-1 inventory form be completed on all "standing structures" at Plum Island and at the PIADC property at Orient Point in order to establish a complete "baseline" inventory. The specifications also stated that "no archaeological assessment is required."

The primary objective was to compile the information necessary to evaluate the properties under the criteria for listing on the National and State Registers of Historic Places to determine the significant resources.

### **Area of the Survey**

The survey covered all of Plum Island (840 acres) and the two parcels at Orient Point owned by the Plum Island Animal Disease Center. Both locations are within the Town of Southold, New York.

### **Research Program**

#### Plum Island's Agrarian Economy, 1700s and 1800s

As it was apparent that no buildings or structures from this era existed on Plum Island, this period was not a research priority. The primary objective was to identify historic maps that would allow a field survey to verify that there were no surviving structures. Otherwise, research was limited to secondary sources to provide a summary history of this period.

#### Plum Island Light Station, 1826 – 1948

The Plum Island Lighthouse has been approved for listing on the State and National Registers by the State Board for Historic Preservation. Research on the history of the lighthouse, which would have required work at the National Archives, was not considered a high priority. Instead, the survey concentrated on the architectural significance of the Plum Island Lighthouse and on an evaluation of existing conditions.

### Fort Terry, 1897 – 1948

A research program to identify the history of Fort Terry and its buildings and fortifications was the highest priority. The research program had two components: specific records on Fort Terry buildings and structures; and War Department publications that would indicate how Fort Terry represented the national system.

Archival material at the Plum Island Animal Disease Center consisted of photographs and building records at the library and an extensive collection of building plans in the engineering department. All of this material was reviewed.

The War Department Reports of Completed Works on all Fort Terry fortifications, compiled by the Coast Defense Study Group, provided the basic information on the fortifications. A book of quarter master's forms dating from the Fort Terry renovations of 1940 – 1941 documented the post buildings.

War Department reports and manuals, particularly from the Endicott and Taft Period, were consulted to understand the role and the significance of Fort Terry in the larger context of national coast defense policy.

### Plum Island Animal Disease Center, 1952 - 1998

Because the archival material at the Plum Island Animal Disease Center was grouped together for Fort Terry and PIADC buildings, the research included reviewing all records for PIADC buildings as well. This information was included on the inventory forms of the PIADC buildings to provide an accurate record.

### **Field Survey**

The intent was to identify all standing structures on Plum Island. Because much of the island is heavily overgrown and many of the fortifications were intentionally concealed, the search was guided by historic references. The field survey was aided by a number of resources including: maps of 1926 and 1944 which located all the Fort Terry structures of those periods; maps of 1952 – 1954 showing all alterations by the Chemical Corps and the Department of Agriculture; a survey of selected Fort Terry fortifications by Alex M. Holder of the Coast Defense Study Group; archival records on all Fort Terry fortifications and post buildings; knowledge of PIADC personnel; and the inventory compiled in 1997 by ENTECH, Inc. for the Resource Conservation and Recovery Act closure of sites on Plum Island. By investigating all sites identified by these sources, a thorough field survey was conducted.

The list of 98 buildings, structures and objects on Plum Island is believed to be a complete list of the "standing structures" on Plum Island, with the exception of the two World War I era anti-aircraft batteries which are inaccessible in a heavily overgrown area.

There are a number of concrete foundations on Plum Island which were not included in the inventory.

Although it was apparent that no structure, other than the lighthouse, predating Fort Terry survived, the 1838 U.S. Coast Survey guided a field investigation of the sites of the houses and barns of that era.



## HISTORIC OVERVIEW – PLUM ISLAND'S AGRARIAN ECONOMY, 1700s and 1800s

Plum Island was the site of two large farms from the early-eighteenth century into the second half of the nineteenth century. Over this period the farms were associated primarily with the Beebe, Tuthill and Jerome families. Plum Island was well suited to pasturage and raising livestock was the chief activity on these two farms. Agricultural activity declined with the death of Richard Jerome in 1869, who at the time owned most of the island. About 1890 A.S. Hewitt, a former Mayor of New London, acquired the entire island planning to develop it as a summer resort. These plans did not materialize and in 1896 and 1901 Hewitt sold all of Plum Island, except the lighthouse reservation, to the War Department.

Samuel Wyllys of Hartford, Connecticut, acquired Plum Island by agreements executed in 1659 with the Corchough and Montauk tribes. In 1675 Governor Andros of the Connecticut Colony granted title to Wyllys. A deed preserved at the New London County Historical Society dated June 7, 1688 records the sale of Plum Island by Wyllys to Joseph Dudley of Roxbury, Massachusetts, who was the governor of Massachusetts Colony from 1702 to 1715.

Dudley divided the island into two parcels and by the early eighteenth century Joseph Beebe was farming the west half of Plum Island and Daniel Tuthill was farming the east half. The Southold historian Augustus Griffin wrote in his 1857 *Journal*, "The two Gull islands, and a farm on the east part of Plumb Island, were owned by Deacon Daniel Tuthill, as early as 1720, or near that date. His farm on Plum Island was in his family until about 1820." Griffin's references to "Silas Beebe's farm on Plum Island" indicate that the farm established by Joseph Beebe was passed on to Samuel Beebe and Silas Beebe who operated the family farm into the early nineteenth century.

The Beebes were succeeded Benjamin Jerome who began purchasing parcels on Plum Island in 1805. By 1834 Richard Jerome, Benjamin's son, owned the entire west half of the island and some of the east half. Richard Jerome continued farming and raising livestock until his death in 1869.

Horatio Spafford described Plum Island in his 1813 *Gazetteer of the State of New York*: "The land is very stony, and produces no wood, except in a small pine swamp." Nathaniel Prime's 1845 *A History of Long Island* notes of Plum Island: "The surface of the island is very rough, rocky, and hilly. There are a few families living upon it."

The 1838 U.S. Coast Survey depicts Plum Island as the treeless island pasture indicated by the contemporary accounts. The Survey shows the farm complex of Richard Jerome just east of the lighthouse and another farm complex east of the present parade ground. The only woodland indicated on the survey is in the vicinity of the ponds that separate Pine Point. The remainder of the island is clearly shown as open pasture except for two large enclosed fields. A sketch entitled "Plum Island"

signed by H.C. Arnold and dated 1867 depicts the lighthouse and the farm of Richard Jerome including a gambrel-roofed house, barn and grazing cattle.

The 1858 *Map of Suffolk Co.* by J. Chace, Jr. identifies the owner of the west farm as "R. Jerome" and the owner of the east farm as "A. Mallory." The 1873 Beers *Atlas of Long Island, New York* identifies the owners as "R. Jerome Est." and "R. Clark."

A ca. 1890 article in *The Sun* (New London) includes an interview with Robert Clark, who sold his farm on the east half of Plum Island to A.S. Hewitt at that time. Clark's account confirms the historic use of Plum Island for pasturing livestock and also documents the plans of A.S. Hewitt to develop the island as a summer resort.

Hewitt sold 150 acres at the east end of Plum Island to the War Department on February 24, 1897 for \$25,000 and sold 690 acres for \$64,700 on June 24, 1901 which gave the War Department title to all of Plum Island with the exception of the lighthouse reservation.

Photographs of the original construction of Fort Terry taken in 1898 document the treeless landscape of Plum Island and show much of the pastureland strewn with rocks. An 1898 photograph entitled "Farm House, Plum Island, Ft. Terry. N.Y." shows Richard Jerome's gambrel-roofed residence with a balanced five-bay front façade, a center chimney, small shed dormers and a rear kitchen wing. This eighteenth-century house was probably built by either Samuel Beebe or Silas Beebe. This house and any agricultural buildings were apparently demolished by the Army at an early date.

## **HISTORIC OVERVIEW - PLUM ISLAND LIGHT STATION, 1826 - 1998**

Plum Island, Great Gull Island, Little Gull Island and Fishers Island extend in a line from Orient Point on Long Island's North Fork across to Watch Hill, Rhode Island. This line of promontories and islands is the eastern terminus of Long Island Sound and the passages between them (Plum Gut, the Race, and Fisher's Island Sound) are the entrances to Long Island Sound. Establishing lighthouses to mark the eastern passages into and out of Long Island Sound was a high priority in the Federal government's developing system of aids to navigation. A lighthouse was built on Little Gull Island in 1806 to guide shipping through the Race and the following year the Watch Hill Lighthouse was constructed to serve Fisher's Island Sound. In 1827 the first Plum Island Lighthouse was built on the eastern shore of Plum Gut. These first three lighthouse were augmented by Race Rock Lighthouse in 1878 and the Orient Point Lighthouse in 1899 which established the present system of five lighthouses at the eastern entrance to Long Island Sound.

In 1826 the Federal government purchased approximately three acres comprising the tip of the northwest point of Plum Island. This promontory in Plum Gut is visible from all approaches to this passageway between Orient Point and Plum Island. The lighthouse built in 1827 was a 30' stone tower carrying an iron lantern. The 1839 "United States Coast Survey" depicts the reservation boundaries, the lighthouse and the separate keeper's dwelling. The 1827 lighthouse tower appears to be at the same location as the present 1869 lighthouse. The keeper's dwelling is shown to be on what is now a level plateau in front of the Oil House. The 1827 keeper's dwelling was still standing in 1879 as seen in two photographs by George B. Brainard taken that year. It is a one-and-one-half-story, side-gable dwelling with a center chimney and a three-bay front facade with a center entrance facing south.

In 1852 the U.S. Congress established a new agency, the Light-House Board, to bring efficient management and the newest technology to the country's system of aids-to-navigation. One of the primary goals was to introduce the Fresnel lens into American lighthouses. The Light-House Board classified all lighthouses according to their function and the distance their signal should carry. The classification was based upon the six orders of Fresnel lenses. Major seacoast lights were equipped with the largest first order lenses; minor harbors and breakwaters would be outfitted with the smallest sixth order lens.

The Light-House Board priority was the system of first order lighthouses on the seacoasts. By 1867 the engineers of the Third Light-House District turned their attention to a system of fourth order lighthouses serving Long Island Sound, Fisher's Island Sound, Gardiner's Bay and Block Island Sound. The Third District engineers developed a standard plan for a fourth order lighthouse with an integral keeper's dwelling and between 1867 and 1869 built six such lighthouses: the 1867 Block Island North Lighthouse, the 1868 Norwalk Island Lighthouse (Conn.), the 1868 Great Captain Island Lighthouse (Conn.), the 1868 Morgan Point Lighthouse (Conn.), the 1868 Old Field Point Lighthouse (N.Y.) and the 1869 Plum Island Lighthouse.

The 1827 Plum Island Lighthouse tower was reported to be in poor condition after an inspection in 1868. Rather than repair the existing tower, the Third District engineers chose to build their new standard fourth order lighthouse. The new Plum Island Lighthouse was outfitted with a fourth order revolving Fresnel lens. The two 1879 photographs by George B. Brainard depict the lighthouse only ten years after it was built. Also seen in these photographs is the fog-bell tower to the west of the lighthouse which was established in 1871 and a boat house on the shore at the east boundary of the reservation next to a wharf extending into Plum Gut.

The Plum Island Lighthouse was deactivated in 1978. An automated light was first set on a pole attached to the Oil House. This was moved in 1992 to a new pipe-frame light tower.

## HISTORIC OVERVIEW – FORT TERRY, 1897 - 1948

### Summary

In the early 1890s, the War Department proposed a new system of fortifications called the Defenses of the Eastern Entrance to Long Island Sound. Dramatic increases in the ranges of seacoast artillery made defense of the five-mile-wide channel between Fisher's Island and Great Gull Island possible for the first time. The proposed system of fortifications would provide a first line of defense for the northern entrance to the Port of New York as well as for the port cities on Long Island Sound.

The proposed locations of forts for the Defenses of the Eastern Entrance to Long Island Sound were, from north to south: Napatree Point, Rhode Island; Fisher's Island; Great Gull Island; Plum Island; and Gardiner's Point, Gardiner's Island. This system would provide fortifications on either side of the entrances from Block Island Sound into Gardiner's Bay, Long Island Sound and Fisher's Island Sound.

On February 24, 1897 the War Department purchased 150 acres at the east end of Plum Island and established Fort Terry. Construction began on the first battery in September 1897. At least one artillery piece was in service during the 1898 Spanish American War.

With the purchase of an additional 690 acres in 1901 Fort Terry covered all of Plum Island with the exception of the lighthouse reservation. Nearly continual construction of fortifications from 1897 to 1914 resulted in a total of eleven batteries, extensive submarine mining capabilities and a sophisticated fire regulation and position-finding system.

The 1898 cantonment area surrounded a small parade ground on a plateau at the west end of the 1897 reservation. The 1901 purchase allowed a new cantonment area for the expanding fort to be developed on a wide plain along Gardiner's Bay, which became the new parade ground. Between 1901 and 1912 Officer's Row was built along the north side of the parade ground and enlisted men's barracks were built at the east end of the parade ground along with a complex of other posts buildings. Most of these post buildings were of brick construction.

Anti-aircraft batteries were installed during the World War I era when some of the early guns were removed for use in the overseas artillery program. Fort Terry also became a training camp for Army recruits during the World War I era when a number of temporary quarters were built. Following this war Fort Terry was placed on "caretaking status" and was maintained by a contingent from Fort H.G. Wright.

In 1941 Fort Terry again became a training camp for Army recruits and a large number of temporary buildings were again constructed.



Nearly all of the remaining guns of the early batteries were removed for scrap during the World War II era when three new batteries were constructed at Fort Terry. By this time the role of Fort Terry in the Harbor Defenses of Long Island Sound was greatly diminished since new powerful guns had pushed the probable location of a seacoast artillery action out to the Atlantic Ocean entrance to Block Island Sound.

On June 22, 1948 the Army declared Fort Terry as surplus property and it was again placed under the custodial care of Fort H.G. Wright. On April 25, 1952 Fort Terry was transferred to the U.S. Army Chemical Corps.

### **Defenses of the Eastern Entrance to Long Island Sound and the History of Fortifications of Long Island Sound and New York City.**

Fort Terry and the Defenses of the Eastern Entrance to Long Island Sound represent the typical evolution of coast defense fortifications in the United States. With each improvement in the range of artillery, fortifications moved from the entrances to individual harbors further toward the sea in order to engage enemy vessels at the greatest possible distance from the protected city.

Prior to establishment of the Defenses of the Eastern Entrance to Long Island Sound, the approach to New York City from the north was protected by Fort Totten on Willets Point and Fort Schuyler on Throgs Point on opposite sides of the entrance from Long Island Sound into the East River. New Haven and New London also had fortifications at the entrances to their harbors.

Dramatic improvements in heavy artillery during the late nineteenth century brought about the modern era of coast defense which led to the capability of defending the entrance to Long Island Sound. As described by Emanuel Raymond Lewis in *Seacoast Fortifications of the United States*: "These improvements, which revolutionized seacoast armament, involved the first large-scale use of steel for guns, the perfection of breech loading, and the introduction of far more effective propellants." The production of good quality steel and new machining techniques also allowed rifled barrels, greatly increasing the range and accuracy of the projectile.

Progress being made by foreign navies in the application of these technologies prompted President Cleveland in 1885 to appoint a Board headed by Secretary of War William Endicott to study the state of American coast defenses and to make recommendations. The "The Endicott Board Report" issued in 1886, formed the basis for the most ambitious program of seacoast fortifications undertaken in this country's history.

The "Endicott Board Report" placed first priority on the defenses of New York Harbor and proposed new fortifications at Fort Schuyler and Fort Totten to guard the "north approach" from Long Island Sound into the East River. The Board also recommended individual fortifications at New Haven and New London. The heavy artillery available in 1886 was considered to have an effective range of two miles

and was not yet capable of defending the five-mile wide entrance to Long Island Sound.

By 1895 improvements in ordnance had increased the effective range of fire sufficiently to allow land-based guns to cover a five-mile-wide channel. The War Department immediately recommended the defense of the eastern entrance to Long Island Sound and Congress provided funds for the new system of fortifications. In 1896 Great Gull Island was transferred to the military and in 1897 and 1898 the War Department purchased large tracts of land on Fisher's Island, Plum Island, Gardiner's Point and Napatree Point. The Defenses of the Eastern Entrance to Long Island Sound were established comprising the following forts, from north to south:

Fort Mansfield, Napatree Point, Watch Hill, Rhode Island  
Fort H.G. Wright (Headquarters), Fisher's Island, Southold, New York  
Fort Michie, Great Gull Island, Southold, New York  
Fort Terry, Plum Island, Southold, New York  
Fort Tyler, Gardiner's Point, Gardiner's Island, East Hampton, New York

Guns at Napatree Point, Rhode Island, and East Point on Fisher's Island covered the two-mile-wide entrance to Fisher's Island Sound. Fortifications at Wilderness Point on Fishers Island and on Great Gull Island guarded either side of the five-mile-wide "Race", the principal deep-water entrance to Long Island Sound. Fortifications on Plum Island and a single battery on Gardiner's Point were intended to defend the three-mile-wide, deep-water entrance to Gardiner's Bay.

The first line of defense for the north approach to New York City moved a hundred miles to the east, from the entrance to the East River at Willets Point and Throgs Point to a line between the east end of Long Island and the western extremity of Rhode Island.

### **Defenses of the Eastern Entrance of Long Island Sound and the "Taft Board Report."**

The document which best establishes the context for understanding the beginnings and early development of Fort Terry and the Defenses of the Eastern Entrance to Long Island Sound is the 1906 "Taft Board Report."

President Theodore Roosevelt appointed a "National Coast Defense Board" in 1905 to review and update the coastal defense plan prescribed by "The Endicott Board Report" of 1886. The Board was headed by Secretary of War William H. Taft. The "Taft Board Report," submitted to the President on February 27, 1906, reviewed recent developments in coastal defense and outlined a plan for the future of the system.

Although issued nine years following the establishment of the Defenses of the Eastern Entrance to Long Island Sound, the "Taft Board Report" is the first planning document to place these defenses in a national context. It also addresses



the evolving technologies and practices of coastal defense which are illustrated at Fort Terry.

The "Taft Board Report" emphasized the developing technologies of accessory equipment which had the potential to greatly increase the effectiveness of the system of heavy artillery and submarine mines established by the Endicott Board. These included a fire control system and telephone communication to increase the accuracy and coordination of fire; the use of rapid-fire batteries to protect mine fields; searchlights to prevent a "run by" or countermining activities at night; and power plants to run the communications system, searchlights and powered-ammunition handling. Some of these improvements had been installed at Fort Terry by 1906, when "The Taft Board Report" was issued and these improvements continued at a steady pace through 1914 when all of these systems at Fort Terry were active and up to date. This evolution is summarized in the "Report":

The details of the system of defense have been modified and added to from time to time to keep pace with the advances in ordnance, electrical appliances, methods of construction, and with changes in design and armament of war vessels. The present system is, therefore, the result of a gradual development and, in addition to the heavy or high-powered guns and submarine mines proposed by the Endicott Board, defended ports are now equipped with rapid-fire guns, and to some extent with power plants, searchlights and range finding and fire control systems, necessary adjuncts of an adequate defense today, though not so considered in 1886.

The Taft Board recognized the significance of the Defenses of the Eastern Entrance to Long Island Sound:

The importance of the fortifications at the entrance to Long Island Sound is due to the fact that they constitute the first and chief line of defense of New York city against naval attack from that direction; that they will prevent the occupation by a hostile fleet of Gardiner's Bay or other interior water as a naval base, and will also protect various manufacturing towns established along the Sound, including New London, Bridgeport, New Haven and others.

The Taft Board recommended \$5,075,706 worth of improvements to the Defenses of Long Island Sound. Only the newly-proposed fortifications of the entrance to Chesapeake Bay were to receive greater funds among the East Coast fortifications. This recommendation resulted in improvements at Fort Terry to the submarine mine defense, improvements to the fire control system and the introduction of searchlights and power plants.

The listing of east coast defenses in "The Taft Report" indicates the national significance of the Defenses of the Eastern Entrance to Long Island Sound:

#### DEFENSES OF FIRST IMPORTANCE

Boston  
Narragansett Bay  
Long Island Sound, eastern entrance  
New York  
Delaware Bay  
Chesapeake Bay

#### DEFENSES OF SECONDARY IMPORTANCE

Kennebec River  
Portland  
Portsmouth  
New Bedford  
Hampton Roads  
Potomac River  
Cape Fear River  
Charleston  
Savannah

#### **Tactical Role of Fort Terry**

The primary role of Fort Terry in the Defenses of the Eastern Entrance to Long Island Sound was to defend Gardiner's Bay to prevent an enemy from entering Gardiner's Bay to establish an anchorage or continue through Plum Gut into Long Island Sound. The principal line of defense was the three-mile-wide, deep-water channel into Gardiner's Bay between Constellation Rock and Gardiner's Point. The effective range of Fort Terry's primary artillery, two 10" guns and eight 12" mortars, extended into Block Island Sound approximately 3000 yards beyond that line. Enemy vessels could be engaged in Block Island Sound on the approach to Gardiner's Bay. The capability to establish mine fields at the entrance and within Gardiner's Bay was a critical part of the defense strategy. (Fort Tyler on Gardiner's Point was intended to contribute to the defense of Gardiner's Bay, but the fort was never armed.)

Secondary functions of Fort Terry appear to have included:

Defense of the two-mile wide channel between Plum Island and Great Gull Island leading from Block Island Sound into Long Island Sound by rapid-fire guns. This channel is only 23 feet deep and contains a reef and rocks which are a hazard to navigation. This route into Long Island Sound would be accessible only to torpedo boats or other light, unarmored craft.

Defense of Plum Gut by rapid-fire guns and possibly by mine fields. This may have been a secondary line of defense for a possible "run-by" of the primary line. The route to Plum Gut from Block Island Sound south of Gardiner's Island was not defended, but accessible only to torpedo boats or light craft that might venture into Long Island Sound or attempt a raid on a fortification. These guns also defended Pine Point which was the most likely landing point for a raiding party approaching from this undefended route.

Fort Terry also had capabilities to establish mine fields in Long Island Sound which could detain an enemy vessel, which had successfully "run by" the primary line, within the range of fire of Fort Terry and Fort Michie.

## Fort Terry Fortifications

On February 24, 1897 the War department purchased from A.S. Hewitt 150 acres at the east end of Plum Island. The purchase included high land at the east end of the main island and all of East Point. With its proximity to the entrance to Gardiner's Bay and the hilly terrain, this purchase was the prime location for batteries

Construction at Fort Terry began with a wharf extending into Long Island Sound directly north of the location of Battery Steele. From this wharf railroad tracks were laid out to East Point to transport material for constructing the batteries. This rail road was later used to transport the guns and ammunition. A photograph at the National Archives entitled "Dock" and dated September 29, 1898 depicts two supply vessels being unloaded at North Wharf. The photograph also shows a locomotive coupled with flat cars on the tracks running out onto the wharf. The 1926 "Post and Reservation Map, Fort Terry" shows the rail road running from "North Wharf" to the batteries at east Point.

The Department of War purchased 690 acres from A.S. Hewitt on June 24, 1901 for \$64,700. With this purchase Fort Terry comprised all of Plum Island with the exception of the 3 acre lighthouse reservation. This provided the new tactical possibilities of mine fields in Gardiner's Bay and new rapid-fire batteries to protect the mine fields.

This historic overview of the Fort Terry fortifications is organized by the components of a seacoast defense installation identified in the 1906 "Taft Board Report": Batteries; Submarines Mines; Fire Control; Searchlights; and Power Plants.

## Batteries

### Batteries, 1898 - 1906

From 1898 to 1901 the first four batteries were constructed at Fort Terry.

Battery	Armament	Date of Transfer
Battery Steele	two 10" B.L. Rifles	March 31, 1900
Battery Kelley	two 4.7" R.F. Guns	March 31, 1900 and March 4, 1901
Battery Stoneman	eight 12" B.L. Mortars	March 4, 1901
Battery Bradford	two 6" R.F. Guns	March 4, 1901

Plans for the initial four batteries were submitted by the U.S. Engineer Office in New London to the Chief of Engineers, U.S. Army Corps of Engineers in Washington between April 1897 and September 1899:

Battery Steele, two 10" B.L. Rifles, April 30, 1897

Battery Kelley, one 4.7" R.F. Gun (emplacement no. 1) April 14, 1898

Battery Stoneman, eight 12" B.L. Mortars, July 11, 1898

Battery Bradford, two 6" B.L. Rifles, April 24, 1899

Battery Kelley, one 4.7" R.F. Gun (emplacement no. 2) September 5, 1899

Construction began on Battery Steele in September 1897 and was completed in March 1899. The two 10" guns were hastily mounted in September and October 1898, before the battery was completed, and just in time for the conclusion of the Spanish American War. It is possible that the first gun mounted at Fort Terry was the 4.7" rapid-fire gun at the no. 1 emplacement of Battery Kelley. The 1898 Chief of Engineers Report as quoted in Jerue's "Fort Terry" states "...one 4.7" gun had been mounted and was serviceable during the Spanish-American War..." A large number of 4.72" Quick-Firing Armstrong Guns were purchased from England as an emergency measure during the Spanish American War, as American rapid-fire guns were scarce at that time.

A map entitled "Sketch Showing Location of Batteries on Plum Island" dated December 1898 at the New London Engineer Office shows the following installations: Battery Steele; Battery Stoneman; and Battery Kelley, emplacement no.1 . A map entitled "Defenses of the Eastern Entrance to Long Island Sound, Emplacement of 5" Wire Wound R.F. Gun" dated September 5, 1899 at the New London Engineer Office includes Battery Bradford and indicates that Battery Kelley emplacement no. 2 was the final installation of the initial phase of battery construction at Fort Terry.

In 1901 the War Department purchased the remainder of Plum Island, with the exception of the lighthouse reservation. This allowed much greater development of Fort Terry as a base for mining operations, especially in Gardiner's Bay. At the same time the new submarine mining facilities were being formulated, construction began in 1903 on seven new batteries for rapid-fire guns to protect mine fields in Gardiner's Bay. These batteries were completed in 1905 and 1906.

Battery	Armament	Date of Transfer
Battery Justin Dimick	two 6" B.L. Rifles	August 31, 1905
Battery Robert Floyd	two 6" B.L. Rifles	November 22, 1906
Battery Henry Campbell	two 3" F.F. Guns	August 28, 1905
Battery James Dalliba	two 3" R.F. Guns,	August 28, 1905
Battery John Greble	two 3" R.F. Guns,	August 28, 1905
Battery Bogardus Eldridge	two 3" R.F. Guns	November 22, 1906
Battery Peter Hagner	two 3" R.F. Guns	November 22, 1906

The only changes to the armament of the Fort Terry batteries between 1906 and 1917 was replacement of the original 4.72" guns at Battery Kelly with 5" rapid-fire guns by 1910. In 1914, with the new submarine mining facilities and a major upgrade of the fire control system, Fort Terry was at its greatest capabilities in the era proceeding World War I. The armament at Fort Terry in 1914 is summarized below.

Primary Armament:

Battery Stoneman	12" B.L. Mortars
Battery Steele	10" B.L. Rifles

Intermediate Armament:

Battery Bradford	6" R.F. Guns
Battery Justin Dimick	6" R.F. Guns
Battery Robert Floyd	6" R.F. Guns
Battery Kelly	5" R.F. Guns

Secondary Armament:

Battery Henry Campbell	3" R.F. Guns
Battery James Dalliba	3" R.F. Guns
Battery John Greble	3" R.F. Guns
Battery Bogardus Eldridge	3" R.F. Guns
Battery Peter Hagner	3" R.F. Guns

No plan or description of the tactical objective of each battery was discovered. Observations on the general use of the different caliber guns from manuals of the period as well as an analysis of the orientation and range of the guns at Fort Terry can give a general picture of the intended role of Fort Terry's batteries in the Defenses of the Eastern Entrance to Long Island Sound.

The *Coast Artillery Drill Regulations*, 1914, define the use of the different classifications of armament:

The guns of the primary armament employ direct fire, and are designed for attacking the sides and other vertical armor of armored vessels....The mortars use high-angle fire and are designed for attacking the decks of armored vessels.

The intermediate armament...are designed for attacking unarmored vessels and the unarmored parts of armored ships, supplementing the fire of the primary armament.

The secondary armament...are designed for the defense of the mine fields and for supplementing the intermediate armament in the attack of unarmored vessels.

The primary batteries at Fort Terry had the principal purpose of defending the deep-water entrance to Gardiner's Bay defined as a line between Constellation Rock to the north and Fort Tyler to the south. The intermediate batteries at East Point supplemented the defense of the entrance and also protected the distant-range mine fields in the vicinity of the entrance to Gardiner's Bay from attempts to clear the mine fields by shallow-draft, unarmored enemy vessels. Other functions of the intermediate and secondary batteries were defense of the passage between Plum Island and Great Gull Island, Plum Gut, and protection of mine fields in Gardiner's Bay and possibly in Long Island Sound. The rapid-fire batteries at Pine Point may also have had a secondary role in defending against a raid in small craft approaching from the south side of Gardiner's Island.



Following is a discussion of the possible role of each of the eleven 1898 – 1906 Fort Terry batteries.

#### Battery Steele.

The two 10" Breech-Loading Rifles, model of 1888, at Battery Steele have been the only guns at Fort Terry classified as primary armament. The Taft Board Report notes the effective ranges of Battery Steele's 10" guns in penetrating 12" armor, depending on the angle of impact, as between 700 yards and 3000 yards and in penetrating 7" armor as being between 6000 and 8000 yards. (Battleships of the period had principal armor 8" to 18" thick; Armored Cruisers had principal armor 3" to 6" thick according to *The Service of Coast Artillery*, 1910.)

Battery Steele's 10" guns were oriented toward the entrance to Gardiner's Bay. The deep-water passage into Gardiner's Bay between Constellation Rock and Fort Tyler is approximately 5000 yards from Battery Steele placing it in the effective range of its guns. Battery Steele's 10" guns could also engage an enemy vessel in Block Island Sound on the approach to Gardiner's Bay.

The only photograph discovered of armament in place in a battery at Fort Terry is of Battery Steele's 10" B.L. Rifle. The photograph in *Long Island Today*, 1909, shows a gun squad of 18 men servicing the 10" gun during a drill.

#### Battery Stoneman.

The eight 12" B.L. Mortars, model 1890, were divided between Battery Stoneman's two mortar pits..

The "Taft Board Report" noted of mortars:

The reason the Endicott Board recommended so many mortars for coast defense was that they attacked an armored vessel in its most vulnerable part – the deck. Their special role was to prevent the occupation of anchorage areas by hostile vessels from which either the defenses or the protected ports might be bombarded. It was not anticipated that they could be effectively used against moving vessels, but by the improvement of the range-finding system the usefulness of mortars for the defense has been very greatly increased, and their fire is now effective against moving as well as stationary targets.

Battery Stoneman is oriented toward the entrance to Gardiner's Bay. The original purpose, as suggested by the "Taft Board Report", may have been to prevent an anchorage in Gardiner's Bay. As detailed below, the fire control system for Battery Stoneman was a priority at Fort Terry. Certainly the role of the battery evolved as generalized in the "Taft Board Report" to include bombardment of a moving vessel in Block Island Sound on the approach to Gardiner's Bay. *The Service of Coast Artillery*, 1910, gives the maximum range of these mortars as 12,019 yards and the minimum range as 2,210 yards.

#### Battery Bradford.

The two 6" Rapid-Fire Guns, model of 1897, at Battery Bradford are noted in the 1905 "Taft Board Report" as having an effective range, depending on the angle of impact, in penetrating 7" armor of between 700 yards and 2,000 yards. *The Service of Coast Artillery*, 1910, notes the penetration in armor at 5,000 yards as 4 inches.

Battery Bradford's guns are oriented toward Great Gull Island covering the 4000 yard passage between the two islands. This passage, with a maximum depth of only 22 feet, could only be navigated by light enemy vessels that could be effectively engaged with the 6" guns. These guns also protected the forward line of mine fields at the entrance to Gardiner's Bay and could provide supplementary fire on a vessel approaching the entrance to Gardiner's Bay.

#### Battery Kelly.

The 5" Rapid-Fire Guns, model of 1900, at Battery Kelly are noted in *The Service of Coast Artillery*, 1910, as having a penetration in armor at 5,000 yards of 3 inches. The location, orientation and range of these guns appears to indicate an intended field of fire within Gardiners Bay.

#### Battery Dimick.

The 6" Rapid-Fire Guns, model of 1903, at Battery Dimick were oriented toward the entrance to Gardiner's Bay and their primary function may have been to protect the first line of mine fields at the entrance. As noted in the Taft Report: "6-inch guns should be used for the protection of ...mine fields at distant ranges."

#### Battery Robert Floyd.

The 6" Rapid-Fire Guns, model of 1903, at Battery Floyd at Pine Point were oriented across Gardiner's Bay toward Fort Tyler, 5550 yards distant. These guns could cover the navigable width of Gardiner's Bay for protection of mine fields.

#### Battery James Dalliba and Battery Bogardus Eldridge.

The 3" Rapid-Fire Guns, model of 1903, at these batteries are noted in *The Service of Coast Artillery*, 1910, as having a penetration in armor at 5,000 yards of only .85 of an inch. The guns of both batteries, Eldridge at Pine Point and Dalliba at East Point, were oriented toward the entrance to Gardiner's Bay. They were intended for protection of mine fields in Gardiner's Bay.

#### Battery Peter Hagner.

The 3" Rapid-Fire Guns, model of 1903, at Battery Hagner on Pine Point, were oriented directly across Plum Gut. Defense of Plum Gut was a secondary line for the approach through Gardiner's Bay, but was a primary line for torpedo boats or other light craft approaching from the south side of Gardiner's Island. Pine Point would have been the most likely target for a raiding party in small boats to attack the fortification. Defending against this possibility may have been another role of the three rapid-fire batteries at Pine Point.



Battery Henry Campbell and Battery John Greble.

The 3" Rapid-Fire Guns, model of 1903, at these batteries at East Point were oriented toward Long Island Sound and were probably intended for protection of the mine fields that would have extended from the mining casemate at the beginning of East Point.

The eleven batteries constructed from 1898 to 1906 had similar designs, materials and methods of construction. The designs of all the batteries were directly related to the type developed by the U.S. Army Corps of Engineers following the directive of "The Endicott Board Report."

All the Fort Terry batteries are based upon standard designs distributed as "mimeographs" by the Corps of Engineers. For Fort Terry these standard designs were adapted to the specific site by the District Engineer in New London. Most batteries, as noted below, adhere closely to the "mimeographs." Battery Steele shows the greatest amount of changes in being adapted to its site.

Except for Battery Stoneman which had eight mortars, all the batteries had two gun emplacements, sufficiently separated to protect the detachment of one gun from the blast effect from the firing of the other gun. The structure separating the two emplacements, known as the central traverse, contained magazines and other service rooms. Additional magazines and service rooms were also sometimes constructed in the flanking parapet walls.

All the batteries were of concrete construction. The gun emplacements and the magazines were protected by a 10' to 20' thick parapet wall across the front and flanks of the battery. The magazines were protected by 10' thick concrete roofs. The four batteries constructed between 1897 and 1899 (Battery Stoneman, Battery Steele, Battery Kelly and Battery Bradford) demonstrate a transitional technology in construction of the thick concrete roofs. In narrow rooms, where roof thickness was not critical, traditional vaulted ceilings were used. Especially in the magazines, where a flat ceiling would allow a thicker roof, steel I-beams were used to support a flat concrete slab. This practice was first used by the Corp of Engineers in 1895. In these batteries the I-beams are exposed as are the cast iron plates in the walls under the beams which distribute the load. The seven batteries constructed between 1903 and 1906 showed a further evolution in technology with the use of steel reinforcing bars embedded in the concrete in place of the I-beams. The roughly-formed concrete walls and ceilings were finished with a cement plaster rendering on all the batteries.

The batteries were either set into the natural grade or the grade was built up around them to provide a minimum of 30' to 40' of sand or earth in front of the concrete parapet wall. The earth embankment provided the main resistance to an enemy's projectiles, which at that time would have had a flat trajectory. Protection from the rear was afforded by another earth embankment behind the battery parade.

The batteries were concealed to make them difficult targets for enemy gunners. The top of the parapet wall and the top of the magazine structure were the same so that the parapet was an unbroken horizontal line easily concealed by the earth embankment. Earth and vegetation on top of the magazine structures increased the concealment. The use of disappearing carriages concealed the gun except when it was fired. The batteries presented no structure or object to be targeted by enemy guns.

The design of Battery Stoneman follows the standard plan reproduced in *Seacoast Fortification Construction*, 1920, as Plate XXVIII "Batteries for Eight 12-Inch Mortars, Drawings Based on Mimeograph No. 27 and First Supplement." Mimeograph No. 27 was issued in 1898, which is also the date on the drawings for Battery Stoneman, which may have been a prototype for this standard design. The eight mortars are divided between two pits which are protected by 35' high parapet walls on the front and flanks, to the rear is an earth embankment. Each mortar pit is served by two shell rooms and two powder magazines which are located in the central traverse and in the flanking parapet walls. Steel trolley rails in the ceilings provided a system for moving the 1,046 pound projectiles from the magazines to the mortars. The magazine structure also contained firing rooms, plotting rooms, a storage battery room, generator room, and bombproof rooms where the personnel could escape the blast effect of firing a mortar salvo.

The design of Battery Steele is related to the standard plan reproduced in *Seacoast Fortification Construction*, 1920, as Plate XIV "Emplacements for Two 10-Inch Guns, Disappearing Carriages, 1898 Type, Drawing Based on Mimeograph No. 4." and has the same emplacement design and general arrangement of rooms. Battery Steele was specifically designed for the narrow ridge at Fort Terry. Rather than the standard side-by-side arrangement, one emplacement was offset to the rear and built at a higher elevation, allowing its gun to fire over the forward gun. The gun platforms are 10' below the top of the parapet wall providing protection for the 10" guns on disappearing carriages as well as for the gun detachment while servicing the piece. Each emplacement has a separate magazine structure containing a powder magazine, shell rooms, storage battery room, plotting room, store room and a central generator room. Steel trolley rails in the ceilings were used to transport the 604 pound projectiles either to the cranes in the parade or to the interior galleries equipped with ammunition hoists to be raised up to the gun platforms.

The plan of Battery Bradford is not represented in *Seacoast Fortification Construction*, 1920. The battery has the typical gun emplacements and lower level magazine structure. The gun platforms are 8' below the top of the parapet wall providing protection for the 6" guns on disappearing carriages. An unusual feature is the roofed passage at the central traverse connecting the two gun platforms. The battery has an extensive complex of service rooms in the lower-level magazine structure. Steel trolley rails transported the 106 pound projectiles from the shot rooms to the cranes at the parade. The evolution in design from the 1899 Battery Bradford to the 1903 Battery Floyd and Battery Dimick reveals a significant simplification in the layout and ammunition service of the 6" battery.

Battery Kelly is unique at Fort Terry in that each gun emplacement is an entirely separate concrete structure. This may be due to the fact that they were not built at the same time.

The design of the two 6-Inch 1903-1906 batteries (Floyd and Dimick) follows the standard plan reproduced in *Seacoast Fortification Construction*, 1920, as Plate XI "Emplacements for Two 6-Inch Guns, Disappearing Carriages, 1903 Type, Drawing Based on Mimeograph No. 59." The two gun emplacements flank a magazine structure in the central traverse. The gun platforms are 6' below the top of the parapet wall providing protection for the 6" rapid-fire guns on disappearing carriages as well as the gun detachment while servicing the piece. The magazine structure contains a separate brick-lined powder room and shell room which are shared by both guns, and each having a capacity of 500 projectiles or cartridges. Powder cartridges were transported through a "powder passage" in the front parapet wall to the gun platforms. The shells were taken on a different route by hand trucks to the parade and carried by hand up the steps to the gun platform. The magazine structure also contains a storage battery room, guard room, office, and storeroom.

The design of the five 3-inch 1903-1906 batteries follows the standard plan reproduced in *Seacoast Fortification Construction*, 1920, as Plate V "Emplacements for Two 3-inch Guns, Pedestal Mounts, 1903 Type, Drawing Based on Engineering Department Sixth Supplement to Mimeograph No. 30." The two gun emplacements flank a magazine structure in the central traverse. The gun platforms are 3'-6" below the top of the parapet wall allowing the barrels of the pedestal-mounted 3" rapid-fire guns to fire at a modest angle of depression. The magazine structure contains a magazine for each gun and a central storeroom, lined with bricks on the walls and ceilings. Powder and shells were carried by hand from the magazines up the concrete steps to the gun platform.

#### Batteries, 1917 - 1921

The American coast was not threatened during World War I and major new works for the coast fortifications were not undertaken. The principal new work at Fort Terry during and immediately following World War I was installation of anti-aircraft guns to protect the other batteries. These were mounted on 18' diameter concrete gun blocks.

Battery	Armament	Date of Completion
A. A. Battery, east of Battery Steele	two 3" anti-aircraft guns	July 1918
A. A. Battery, east of Jerome Reservoir	two 3" anti-aircraft guns	January 1921

Batteries were also abandoned during this period as guns were dismantled to be used in the artillery program overseas where there was a greater need for them. In 1917 four of the 12" mortars at Battery Stoneman were dismantled to be used in the railway artillery program. The 6" guns at Battery Dimick and Battery Floyd were removed for use in the field artillery program as were the 5" guns at Battery Kelly.

#### Armament Removal, 1931 – 1934

During the period that Fort Terry was on care-taking status the guns were removed from three batteries that had been declared obsolete. In 1931 and 1932 the 3" guns were removed from Battery Hagner. By 1934 the 3" guns had been removed from Battery Campbell and Battery Greble.

#### Batteries, 1940 – 1944

The significance of Fort Terry was diminished during this era when the first line of defense moved outward from the entrance to Long Island Sound to the entrance to Block Island Sound.

Planning the World War II era fortifications for the Harbor Defenses of Long Island Sound began in 1940 when the Corps of Engineers appointed a Board to study the defenses of Long Island Sound, New Bedford and Narragansett Bay. The Board's report, issued on November 9, 1940, proposed defending the sea boundary to Long Island Sound and Narragansett Bay in one system to protect "the most important strategical area in the continental United States."

Based on the recommendations of this report new 16" guns were emplaced at Montauk Point, Fisher's Island, Point Judith and Sakonnet Point. The 1940 report indicates the effective range of fire of these 16" guns was 38,000 yards (21 miles). With this range, the guns at Montauk Point covered the entrance to Block Island Sound from the Atlantic between Montauk Point and Block Island. The new 16" guns on Fisher's Island and the existing 16" gun at Fort Michie covered all of the western half of Block Island Sound. The 16" guns at Point Judith covered the entrance to Block Island Sound between Rhode Island and Block Island. The Point Judith guns and the 16" guns at Sakonnet Point defended the entrance to Narragansett Bay with a range extending far into Rhode Island Sound.

The entrance to Gardiner's Bay was far to the rear of the first line of defense and its defense by Fort Terry assumed a secondary level of importance. Activity at Fort Terry in the World War II era included disarming some of the early batteries and constructing three new batteries.

*Seacoast Artillery Weapons*, 1944, notes of the Endicott and Taft era batteries: "The emplacement, designed to afford protection against flat-trajectory naval fire, is now vulnerable to attack by bombardment aviation and to fire from long-range naval guns whose shells have a high angle of fall." This vulnerability may have been part of the reason that most of the remaining armament was removed from the existing Fort Terry batteries between 1942 and 1944. The steel was certainly salvaged for use in manufacturing new armament. During this period the following guns were removed: the remaining four mortars at Battery Stoneman; the 10" rifles in Battery Steele; and the 6" guns in Battery Bradford. Only the 3" guns at Battery Dalliba and Battery Eldridge remained in place.



The new batteries constructed at Fort Terry during the World War II era are listed below.

Battery	Armament	Date of Transfer
Unnamed, at apron of Battery Steele	four 155mm guns	October 26, 1940
Anti Motor Torpedo Boat No. 911	two 90-mm guns, M1	December 20, 1943
Construction No. 217	two 6" guns	July 1, 1944

The battery of four 155mm guns extending from the apron of Battery Steele to the bluff at Gardiner's Bay had "Panama mounts" where the carriage pivoted on a concrete mount with the trail ends of the carriage riding on a circular rail embedded in a concrete ring. These guns, at an elevation of 83', were oriented toward the entrance to Gardiner's Bay. With a maximum range of 25,700 yards these guns effectively covered the approach to Gardiner's Bay from Block Island Sound.

The Anti Motor Torpedo Boat Battery No. 911 at Pine Point consisted of concrete firing platforms for the two 90 mm guns. *Seacoast Artillery Weapons*, 1944, describes this gun: "Seacoast artillery employs the 90-mm gun M1, supported on the fixed 90-mm gun mount M3, to fire against ground or water targets, especially motor torpedo boats." The gun was fitted with a shield to protect the gun and personnel. This battery at the entrance to Plum Gut was oriented toward the south end of Gardiner's Bay to intercept torpedo boats venturing around the south side of Gardiner's Island and attempting to run through Plum Gut into Long Island Sound.

Battery Construction No. 217 was the principal intermediate battery of the World War II era. The same battery was constructed at Fort Michie, Fort H.G. Wright and at Montauk Point. The November 9, 1940 Board report described the purpose of the 6" guns as "protection of the major armament and to deny the use of this water area to enemy torpedo craft." A bombproof concrete structure contained the magazines and service rooms. The guns were on open barbette mounts; steel shields provided some protection for the gun and personnel. This battery was completed, but the 6" guns were never mounted.

### Submarine Mines

Submarine mines were viewed as an essential component of the coast defense system from the period of the 1885 Endicott Board through the World War I era. Submarine mines consisted of an explosive charge and firing device inclosed in a water-tight steel case. The mines were deployed in groups and fixed in position at strategic locations designed to obstruct passage through a channel and to hold an enemy vessel within the most effective firing range of the heavy artillery. The mines were connected by electrical cables to a mining casemate at the fort where their detonation was controlled.

The mine fields had to be protected from enemy attempts to clear the mine fields by countermining or by dragging for the electrical cables using small boats. Rapid-fire batteries were constructed to cover the mine fields and searchlights were installed for effective protection at night when enemy raids on the mine fields would most likely occur.

The tactical use of submarine mines is explained in the *Manual for Submarine Mining*, 1912,

"Where ordinary ship channels are unobstructed it is possible for modern battleships, with their high speed and heavy armor, to run by shore batteries, at least in the night or during a fog; hence the defense of such channels should not be left to guns alone.

On the other hand, where mines are unprotected by the fire of shore batteries it is possible for an enemy to remove or disable them.

Therefore guns and mines, the two elements of the fixed defenses of a harbor, are mutually dependent... Within the zone between 4,000 and 8,000 yards of the main defense the fire of heavy guns is destructive for warships, yet the latter are at such a distance that their rapid-fire guns will be of little effect against the batteries... If possible, therefore, hostile vessels should be held in this zone by some obstacle. Such an obstacle is afforded by a mine field.

On the other hand, attacks upon a mine field are most liable to be made by small boats at night. If the mine field be at too great a distance from the defenses, these boats will not be revealed by the mine searchlights. Furthermore, for protections against such attacks, the defense relies upon rapid-fire guns of relatively limited range.

Due to the above considerations the outermost mines are usually placed between 3,000 and 4,500 yards from the main defense. In general, there should be in each main channel at least three lines of mines.

The importance of submarine mines was emphasized by the 1906 "Taft Board Report":

Torpedoes in the form of submarine mines are as much an essential feature of seacoast defense as they were at the time of the Endicott Board... submarine mines are designed to close all channels of approach to hostile ships but to permit the passage of friendly vessels... The mine fields are located so as to hold an attacking fleet under the most effective fire of the guns ashore and at the same time to deter a "run by.".... To successfully maintain and operate a system of submarine mines, the following accessories or adjuncts are necessary: storehouses, operating casemates, loading rooms, boats, range-finding stations and apparatus and searchlights.

Submarine mines were a part of the initial defenses planned for Fort Terry. A drawing entitled "Defenses of the eastern entrance to Long Island Sound, Mining Casemate" transmitted from the New London Engineer on April 23, 1897 was the first Fort Terry structure to be approved. The Mining Casemate is depicted on the December 1898 "Sketch Showing Location of Batteries on Plum Island, N.Y." The concrete casemate was set into a sandy hill at the beginning of the rise to East Point

and was completely covered with sand. A tunnel for the electrical cables controlling the mines led from the casemate to the bluff at the Long Island Sound beach. This exit point for the cables appears to indicate the lines of submarine mines were to be laid out from the north side of East Point into Long Island Sound. The mines would have been loaded onto the mine planter at North Wharf, a short distance west of the mining casemate. Whether this mining casemate was ever used is not known. No other Mine Command structures of this initial period, 1898-1901, are documented.

Structures and fortifications completed in 1905 and 1906 allowed mine fields to be established in Gardiners Bay and Plum Gut. South Wharf extending from the east side of Pine Point into Gardiners Bay provided the base of operations. At the wharf were constructed a brick mining casemate and a wood frame Torpedo Loading Room, both transferred to the Artillery Company on May 29, 1906. Also in 1905 and 1906 3" and 6" rapid-fire gun batteries were built, apparently to protect these potential mine fields. Battery Peter Hagner (3" R.F. Guns) was completed on the west shore of Pine Point overlooking Plum Gut. Battery Robert Floyd (6" F.F. Guns) and Battery Bogardus Eldridge (3" R.F. Guns) were built on the east shore of Pine Point overlooking Gardiner's Bay. Battery James Dalliba on the south bluff of East Point was oriented toward the entrance to Gardiners Bay where the forward line of mines at 6000 yards from the mining casemate could be placed.

From 1911 to 1914 major construction projects at Fort Terry further enhanced the submarine mine capabilities. A 13,000 square foot Combined Torpedo Storehouse and Cable Tanks was built a short distance inland from South Wharf and transferred in January 1911. In March 1911 Plum Gut Harbor was excavated. A 300' foot-long Torpedo Wharf on the south side of the new harbor was transferred on April 24, 1914. At the same time a 4,400' railroad was laid connecting Torpedo Wharf to the Combined Torpedo Storehouse and Cable Tanks at South Wharf. The railroad also had a spur running onto South Wharf. A Torpedo Loading Room, Torpedo Magazine and Service Magazine Room were built next to the railroad at Torpedo Wharf and were also transferred on April 24, 1914. On Torpedo Wharf was a "10-ton stiff-leg derrick". The locomotive which pulled the flat cars along the railroad is depicted in front of the Torpedo Storehouse in an undated photograph and is the same locomotive shown on North Wharf in the 1898 photograph.

Mines and the electrical cables which connected them to the shore were stored in the Combined Torpedo Storehouse and Cable Tanks. To be deployed these would be taken by railroad to South Wharf for mining operations in Gardiner's Bay or to Torpedo Wharf for mining operations in Plum Gut and possibly Long Island Sound. At the wharves the mines and cables would be loaded onto a mine planter.

Construction of a new Bombproof Mining Casemate, transferred on April 6, 1921, indicates that submarine mining remained an important function at Fort Terry through the World War I era. The new casemate was within a concrete bombproof shelter intended to protect it from aerial bombardment and from the high trajectories of the new naval artillery. The new casemate was a short distance from the shore of Gardiner's Bay, north of the Torpedo Storehouse. The mine cables leading from Gardiner's Bay were connected in a subterranean concrete Mining Cable Hut close to the shore in front of the casemate. The location of this new



casemate indicates that mine fields at the entrance to and within Gardiner's Bay were the principal area of mining operations at Fort Terry.

By the World War II era, the line of defense had moved so far seaward that the Army type of mine field, connected by electrical cable to the fort, could not be effectively deployed. The Combined Torpedo Storehouse and Cable Tanks was transferred to the quarter master in 1940 for use as a dormitory for recruits being trained at Fort Terry.

The structures and apparatus associated with submarine mining operations are summarized in *Seacoast Fortification Construction*, 1920:

These buildings are the mining casemates from which the mines are operated; the conduits connecting the casemates with the shore; the cable terminals on the shore; the cable tanks in which the cable is stored when not in use; the torpedo storehouses in which are kept the mine cases and other material; the loading rooms in which the mines are loaded; the magazines in which the dynamite is stored; the range stations, plotting rooms and dormitories; the torpedo wharves at which the mine planter is to land and receive the loaded mines; and the tramways connecting the wharves with the cable tanks, storehouses, loading rooms, etc.

Below are listed the submarine mine structures at Fort Terry and the date of transfer (batteries and fire control structures associated with the mine command are listed in their respective sections):

Mining Casemate	April 30, 1901
South Wharf, Mining Casemate, Torpedo Loading Room	May 29, 1906
Combined Torpedo Storehouse and Cable Tanks	January 21, 1911
Torpedo Wharf at Plum Gut Harbor, Torpedo Loading Room, Torpedo Magazine, Service Magazine Room and Tramway to Torpedo Storehouse and South Wharf	April 24, 1914
Bombproof Mining Casemate and Mining Cable Hut	April 6, 1921

## Fire Control

The term fire control has two meanings: fire regulation and position finding. As defined in the 1924 "Coast Artillery Corps Training Regulations": fire regulation determines the objective of fire, the volume and concentration of fire and the accuracy of fire; and position finding determines the range and direction of any target from a directing point or station.

The hierarchy of the fire regulation system was as follows:

Battle Command	
Fire Commands	Mine Commands
Batteries under a Fire Command	Batteries & Minefields under a Mine Command

A fire command usually included guns of the same caliber having the same field of fire. The clearest picture of the command structure at Fort Terry comes from the modernizing of the fire control system in 1914. At that time Fort Terry had one battle commander, three fire commands and one mine command.

Three systems of position finding were used at Fort Terry during the period 1898 – 1923. All three systems used triangulation to determine the position of a target by measuring the sighting angles from a known baseline. The “horizontal base system” employed Azimuth reading instruments in stations at either end of a baseline (primary station and secondary station); the readings from each station were transmitted to a plotting room where the location of the target was calculated. The “short horizontal base system” employed a 9’ Coincidence Range Finder which contained a 9’ baseline within the instrument allowing the horizontal angle and the range to be determined from a single station. The “vertical base system” used triangulation in a vertical plane and employed a Depression Position-Finder, where the elevation of the instrument axis was the baseline, to find the horizontal angle and the range to a target from a single station.

The horizontal base system was the most accurate and the preferred system. The C.R.F. and the D.P.F. could be used for an immediate reading at the battery commander’s station to be corroborated by the horizontal base system and as a back-up system if there was a loss of communication between the primary and secondary station.

The 1905 “Taft Board Report” indicated that “the approved system of fire control and direction is a development effected during the years succeeding the Spanish-American War” and noted “experiments are still in progress with a view to improving some of the appliances.” The Board highly recommended installing up-to-date systems at all coast defense installations. The system of fire control at Fort Terry reflects an evolution from the initial construction in 1898 through 1923.

Most of the fire control structures were observing stations where targets were sighted using an observing instrument (Azimuth, D,P,F. or C.R.F.). The Commander’s Stations were also equipped with telescopes. The observing stations all had pedestals for mounting the observing instruments; observation slots, a band of awning windows usually 12” high corresponding with the axis of the observing instrument; and data transmission equipment. These stations had flat roofs to make them inconspicuous and were usually concealed by earth embankments up to the level of the observing slot. Materials of construction evolved from wood to cement-plaster panels on a steel frame, to reinforced concrete.

Other types of fire control structures at Fort Terry included plotting rooms, booth rooms, a meteorological station, a tide station, a radio station, a telephone switchboard room and a radar station.

## Fire Control Structures, 1898 - 1902

The fire control structures for the initial three batteries constructed at Fort Terry are shown on the December 1898 "Sketch Showing Location of Batteries on Plum Island, N.Y." A Fire Commander's Station is on Signal Hill, south of the original parade ground, which with an elevation of 95' was the highest point on the original 150 acre Fort Terry reservation. Battery Commander's Stations for Battery Steele and Battery Stoneman were each set back on high ground a short distance from their batteries. The 1903 Report of Completed Structures indicates the Fire Commander's Station was a concrete and steel structure with a translucent roof and the two Battery Commander's Stations had concrete walls and iron roofs. The Battery Commander's Station for Battery Kelly was an open crow's nest adjacent to the gun emplacement.

Battery Bradford is not included on the 1898 map but was completed in October 1900 and transferred on March 4, 1901. Battery Steele, Battery Stoneman and Battery Bradford had crow's nests observing stations at the battery parapets.

Nine fire control structures were transferred in August 1902. These included one Depression Position-Finding Station and eight Horizontal-base Stations. These nine stations are described on the Report of Completed Works as "temporary wooden structures." The eight Horizontal-base Stations included: "Two combined or a primary station for Battery Bradford. One near the fire command station for use as a wireless station. Two near the mine primary station...and used as secondary stations. Two additional horizontal-base stations, heretofore reported as combined for a mine primary station near South Dock and one near Battery Stoneman."

Batteries Steele, Stoneman and Bradford appear to have originally had a horizontal position-finding system with the Battery Commander's Stations as the primary station and one of the "temporary wooden structures" as the secondary station. The Depression Position-Finding station was associated with one of these batteries.

Communication between remote stations may have been by wireless telegraph. Communication from the Battery Commander's Stations of Steele and Stoneman to the gun emplacements and plotting rooms was by speaking tubes.

This list of the 1898 - 1902 fire control structures gives their location, the axis elevation of the instrument and the date of transfer. The information is taken from the Report of Completed Works for each station.

*B.C. - Battery Commander's Station*

*D.P.F. - Depression Position-Finder*

*F.C. - Fire Commander's Station*

B.C. (Steele) 250' west of battery, 90'	March 31, 1900
B.C. (Stoneman) 320' s.w. of battery, 80'	March 4, 1901
B.C. (Kelley) crow's nest at battery, 69'	March 4, 1901

F.C., Signal Hill south of old parade ground, 110'	August, 1902
D.P.F. Station, location not known	August, 1902
Eight Horizontal-base Stations, various locations	August, 1902

#### Fire Control Structures, 1906 – 1908

In 1906 "two booths for telephone and telautograph" were constructed at Battery Stoneman, one for each mortar pit. This is the first documented use of the telephone in the fire control system. A telautograph is described in *The Service of Coast Artillery* as: "An electro-mechanical instrument by means of which the movement of an attached pencil used by a person writing at one end of the circuit, will automatically trace or reproduce the characters, as written, at the other end." The telautograph booth at Battery Steele may have been built at the same time. These booths in the mortar pits brought fire direction data more quickly and reliably to the pit commander.

A tide station installed at North Wharf in 1907 provided data for adjustments to the readings of the Depression Position-Finders.

In 1908 three fire control structures were built to provide a position-finding system for the new mine fields intended for Gardiner's Bay. Construction of South Wharf and an adjacent Mining Casemate and Torpedo Loading Room in 1906 allowed mining of the entrance to Gardiner's Bay, Gardiner's Bay and Plum Gut. The mine fields were to be protected by the new rapid-fire batteries completed in 1905 and 1906. The new fire control buildings were a double primary station, a secondary station and a supplementary station for the Third Mine Command. The primary station on Gardiner's Bay, the secondary station on Plum Gut and the supplementary station at the tip of Pine Point established two baselines of a horizontal position finding system. These stations could provide range data on targets approaching the entrance to Gardiner's Bay, in Gardiner's Bay and in Plum Gut. The Double Primary Station included plotting rooms equipped with a Mine Plotting Board (the double station allowed plotting the position of two vessels). Information would be transmitted to the Mining Casemate where mines located under the target could be detonated.

Two additional supplementary stations at Pine Point provided an optional observing station for the horizontal position-finding systems of Battery Steele (F4) and Battery Stoneman (F5).

The Double Mine Primary Station and the Mine Secondary Station had wood frames with cement plaster on the exterior and interior. The three supplementary stations had concrete walls and open roofs. Data was transmitted from these new observing stations by telephone through buried conduits.

This list of the 1906 – 1908 fire control structures gives their location, the axis elevation of the instrument, the type of observing instrument and the date of transfer. The information is taken from the Report of Completed Works for each station.

Two telephone and telautograph booths, Battery Stoneman	June 15, 1906
Tide Station, North Wharf	August 22, 1907
Double Mine Primary Station M' 3 – M' 3, bluff south of Parade Ground, 43', D.P.F.	April 29, 1908
Mine Secondary Station, M''3, 600' south of Lighthouse, 28'	April 29, 1908
Base End Station M'''3 , Pine Point, 14', Azimuth	1908 (attributed)
Base End Station F'''5 , Pine Point, 14', Azimuth	1908 (attributed)
Base End Station F'''4 , Pine Point, 14', Azimuth	1908 (attributed)

#### Fire Control Structures, 1914

The range finding and fire control system at Fort Terry was thoroughly updated in 1914. New facilities included nine observing stations, six plotting rooms, two booth rooms, one meteorological station, a telephone switchboard room and miles of underground conduit for the telephone system. The new observing stations were equipped with Depression Position-Finding instruments or Coincidence Range Finders allowing position-finding from a single station. Five pedestal-type battery commander's stations may also date from 1914.

The identification of these facilities provides some information on the command structure at Fort Terry at this period. The Fort Terry Battle Commander had at least three fire commands and one mine command under his direction. The fourth fire command directed the 10" guns of Battery Steele. The fifth fire command directed the 12" mortar fire from Battery Stoneman. The sixth fire command directed fire from the 6" rapid fire guns of Battery Bradford and Battery Dimick. The four light artillery batteries at East Point may have been included in this command. The third mine command covered the mine fields connected to the mining casemate at South Wharf in Gardiners Bay and may have included the three rapid-fire gun batteries at Pine Point. This division followed the typical pattern where separate fire commands were given to each classification of artillery (heavy mortars, heavy artillery, medium artillery and light artillery) covering the same field of fire.

The new telephone communications system allowed quicker and more reliable data transmission. The new instruments gave most battery commanders two systems of position-finding: the more accurate horizontal-base system using readings from the primary and secondary stations; and the alternate of using a depression position-



finder or coincidence range-finder to locate a target from a single station. The plotting room, attached to the primary station, allowed an efficient calculation of position from the readings received from the primary and secondary stations. The booth rooms provided an organized system of communication at the stations of the battle commander and fire commanders.

The Battle Commander's Station, C2 (Terry) on Signal Hill, received a booth room where data was received and transmitted by telephone or telautograph. Presumably the four booths corresponded to the three fire commands and the one mine command. Meteorological instruments installed at this station provided data on wind direction and velocity and atmospheric density, factors calculated into directing the guns. The Battle Commander's Station was also the signal station where communication with vessels and other forts was conducted with signal flags.

A priority of the 1914 work was upgrading Fort Terry's heavy artillery fire commands. The fourth fire command (10" guns at Battery Steele) and the fifth fire command (12" mortars at Battery Stoneman) each received a plotting room at the primary station and a new secondary station.

The new station for the sixth fire command included an observing room and an attached booth room. This new station was on a hill directly overlooking Battery Bradford and Battery Dimick. The booth room contained seven booths, probably indicating that this fire command included not only the 6" guns at Battery Bradford and Battery Dimick, but all the rapid-fire batteries at East Point: the 5" guns at Battery Kelly and the 3" guns at Battery Greble, Battery Campbell and Battery Dalliba.

New Battery Commander's Stations were constructed on the traverses of Battery Bradford, Battery Dimick and Battery Floyd, the three Fort Terry batteries with 6" R.F. guns. The rooms in the magazine structures beneath these new stations were converted into new plotting rooms.

The primary station for Battery Kelly received a new Plotting Room.

New 9' C.R.F. Stations were built at Battery Hagner and Battery Eldridge. Both stations were built on the flank of the battery so that the reading from the Coincidence Range-Finders could be directly applied to aiming the guns.

The Signal Corps Switchboard Room was constructed to facilitate the operation of the telephone system. Storage batteries provided emergency power for the telephone system.

The 1914 fire control structures shared a common type of construction. Wall frames of riveted steel angle iron held metal Hy-rib lath to which a cement plaster finish was applied on the exterior and interior. The observing stations had wood frame roofs with a tar and gravel cover. The plotting rooms, booth rooms and the switchboard room had steel bowstring roof trusses covered with cement-plaster on Hy-rib lath; these structures also had wood casement windows. Some observing rooms to which plotting rooms or booth rooms were added were apparently existing

wood structures. The only exception to the above is the plotting room of Battery Kelly which was of concrete construction.

The five 3" rapid-fire gun batteries received a simple Battery Commander's Station. These were concrete pedestals with a telephone recess. The stations for Battery Campbell and Battery Greble were a short distance from the battery on high ground with a view of the field of fire. These stations had Azimuth instruments and communicated data to the battery by telephone and range positing devices. Battery Dalliba, Battery Eldridge and Battery Hagner had stations at the rear of the battery parade, close to the gun pits but with no view of the field of fire. These three battery commanders transmitted data to the gun pits by voice. The Report of Completed Work forms provide no dates for these five B.C. stations. They appear to be connected with the extensive telephone system installed in 1914 and for that reason they are grouped here with the 1914 stations.

This list of the 1914 fire control structures gives their location, axis elevation of the instrument, the type of observing instrument and the date of transfer. The information is taken from the Report of Completed Works for each station.

*B' - Primary Station of a Battery*

*BC - Battery Commander's Station*

*C - Battle Commander's Station*

*CRF - Coincidence Range-Finder*

*DPF - Depression Position-Finder*

*F' - Primary Station of a Fire Command*

*F'' - Secondary Station of a Fire Command*

*P - Plotting Room*

Combined C2 (Terry) F''5 (Stoneman) & Meteorological Station, Signal Hill south of old parade ground; C2 110', D.P.F.; F''5 115', D.P.F.	March 20, 1914
F'4, BC & P (Steele), 250' west of battery, 90', D.P.F.	March 20, 1914
F''4 (Steele), 260' s.w. of Stoneman, 83', D.P.F.	March 20, 1914
F'5, BC & P (Stoneman), 320' s.w. of battery, 86', D.P.F. and Azimuth	March 20, 1914
F'6, (Terry) 100' s.w. of Bradford, 80', D.P.F.	March 20, 1914
B', BC & P (Bradford) in traverse of battery, 70', D.P.F.	March 20, 1914
B', BC & P (Dimick) in traverse of battery, 76', D.P.F.	March 20, 1914
CRF, BC & P (Floyd) in traverse of battery, 30', 9' C.R.F.	March 20, 1914
CRF & P (Kelly), 80' west of battery, 79', C.R.F.	March 20, 1914
9' CRF (Hagner), right flank of battery, 26', 9' C.R.F.	March 20, 1914

9' CRF (Eldridge). left flank of battery, 26', 9' C.R.F.	March 20, 1914
Signal Corps Switchboard Room, 200' n.w. of Steele	March 20, 1914
BC (Campbell) 70' s.e. of battery, 43', Azimuth	not transferred
BC (Greble), 125' south of battery, 65', Azimuth	not transferred
BC (Dalliba), rear of battery parade	not transferred
BC (Eldridge), rear of battery parade	not transferred
BC (Hagner), rear of battery parade	not transferred

#### Fire Control Structures, 1920 - 1923

In 1920 a Radio Station was constructed in a concealed and sheltered location north of the parade ground. This station provided wireless communication with other forts and with the boats setting the mines. The Radio Station was constructed of hollow tiles with a cement plaster finish on the exterior and interior.

In 1923 new 9' C.R.F. stations were built for Battery Campbell and Battery Greble which provided these 3" rapid-fire gun batteries with independent position-finding instruments. These two stations had concrete walls and reinforced concrete roof slabs supported by steel posts and ridge beam.

The threat of bombardment by aircraft and new types of naval guns able to direct shells on targets with a "plunging" trajectory compromised the protection afforded by earth embankments. In response to this new threat a concrete "bombproof" shell was constructed in 1920 enclosing the 1914 Signal Corps Switchboard Room.

This list of the 1920 - 1923 fire control structures gives their location, axis elevation of the instrument, the type of observing instrument and the date of transfer. The information is taken from the Report of Completed Works for each station.

Radio Station, north of parade ground	May 18, 1920
9' CRF (Campbell), 100' west of battery, 45', 9' C.R.F.	July 26, 1923
9' CRF (Greble), 200' n.w. of Bradford, 43', 9' C.R.F.	July 26, 1923

### Fire Control Structures, 1943 - 1944

During this period a radar station and four new fire control stations were built and five existing stations were reconstructed. These nine Fort Terry stations were part of the vast system of fire control stations associated with the Harbor Defenses of Long Island Sound during the World War II era. A total of 82 stations were located not only at the other original forts of the Long Island system (Mitchie, H.G. Wright, Tyler and Mansfield) but also at Gardiner's Island, Montauk, Amagansett and East Hampton in New York; Pine Island in Connecticut; and Watch Hill, Noyes Point, Charlestown, Green Hill and Block Island in Rhode Island. This system was required by the extensive field of fire of the new 16-inch guns and was facilitated by radio communication between remote island stations.

The 1940 map "Location of Elements H.D. of Long Island Sound" indicates the fire control stations at Fort Terry were intended to serve the following batteries:

Battery 214	Wilderness Point, Fisher's Island
Battery 215	Fort H. G. Wright, Fisher's Island
Battery 217	Fort Terry
Battery Maitland	Fort Mitchie
Battery Benjamin	Fort Mitchie

Radar became the primary position-finding system. The horizontal-base system was retained as a back-up system. The observing stations were equipped with Azimuth instruments and operated much as the 1898-1923 era stations did, although the lengths of the baselines were greatly increased allowing more accurate targeting.

The SCR - 296A radar station for Battery Construction No. 217 had a 100' steel tower with a radar instrument painted to simulate a water tower. Guns were never mounted at Battery Construction No. 217 and the Signal Corps Radio surface surveillance radar unit was apparently never used.

Three completely new observing stations were built during this period (1-G, 1-GG, and 1-V). Two existing wood observing stations were replaced with new concrete stations (1-O and 1-S). Two existing stations with steel frames and cement plaster wall panels were replaced with new concrete stations (1-I and 1-R). All eight new observing stations had reinforced concrete walls and reinforced concrete slab roofs supported on steel posts. Two stations were of the "manhole" type (1-GG and 1-P), five were of the "manhole modified with side door" type (1-G, 1-I, 1-O, 1-R and 1-S) and one was of the "dug-in" type (1-V). All stations were equipped with Azimuth observing instruments.

This list of the 1943 - 1944 fire control structures gives their location, axis elevation of the instrument, the type of observing instrument and the date of transfer. The information is taken from the Report of Completed Works for each station.

#### New Stations:

SCR – 296A (Battery No. 217), south of Battery Kelley	September 14, 1943
No. 1 – G, Jerome Hill, 102', Azimuth	June 6, 1944
No. 1 – GG, Jerome Hill, 95', Azimuth	June 6, 1944
No. 1 – V, at Battery No. 217, 67', Azimuth	April 28, 1944

#### Rebuilt Stations:

No. 1 – I, , F"5 observing room replaced at Combined C2, F"5 and Meterlogical, 1914, 114' and 110', Azimuth	June 6, 1944
No. 1 – O, new observation room at F'5, BC & P (Stoneman), 1914, 86', Azimuth	June 6, 1944
No. 1 – P, 260' west of Stoneman, 83', Azimuth	June 6, 1944
No. 1 – R, new station at B', BC & P (Dimick), in traverse of battery, 76', Azimuth	March 3, 1944
No. 1 – S, new observation room at F'6, (Terry), 1914, 100' s.w. of Battery Bradford, 76', Azimuth	March 3, 1944

#### Searchlights

The technology for producing effective searchlights had developed rapidly in Europe in the 1890s and the contribution searchlights could make to seacoast fortifications was carefully considered in the 1906 "Taft Board Report". The report concluded that searchlights would allow the system of fire control to be as effective at night as during the day and would do "away with the advantages the darkness would give the attack in attempted 'run by' or in forcing a passage."

The first documented searchlight installed at Fort Terry was Searchlight No. 7 which had a 36" projector mounted on a disappearing platform. This searchlight in a brick shelter on the south bluff of East Point could be raised through a trap door in the roof for nighttime operation. This experimental design, which may have been overly complicated and expensive, was never put into production. It is not known how long this searchlight remained active at Fort Terry.

The powerful 60" searchlight, with a range of 6,000 to 8,000 yards, became the preferred type shortly after the 1906 "Taft Board Report" and these were gradually installed at the seacoast forts. Five 60" searchlights were installed at Fort Terry in 1912. All five searchlights were concealed within identical shelters having a steel



wall frame, steel bowstring roof trusses, and wall and roof panels of cement plaster on Hy-rib lath. These shelters were hidden from the view of approaching vessels by earth embankments. The searchlights were mounted on trucks which at night could be moved by hand along standard gauge tracks to their open operating positions at the edge of the bluff.

Searchlights Nos. 11 and 12 at the tip of East Point could detect vessels approaching the entrance to Gardiner's Bay. Searchlights Nos. 13 and 14 on the summit of South Hill covered the entrance to Gardiners Bay and Gardiners Bay itself. Searchlight No. 15 on the bluff at the lighthouse could detect vessels in Plum Gut and Long Island Sound.

### **Power Plants**

The introduction of electric power at the seacoast forts was another of the principle recommendations of the 1906 "Taft Board Report" which noted:

The use of electricity in connection with seacoast defense has become necessary for:

1. Current for motors to operate ammunition hoists.
2. Current for the system of range finding, fire control and direction.
3. Current for searchlights.
4. Current for lighting various parts of the emplacements and range-finding stations.
5. Current for motors for retracting the guns on disappearing carriages.

The "Report" recommended a steam-driven central power plant; reserve power plants at the batteries equipped with gas or oil generators; separate power plants for the searchlights; and separate power plants for mine casemates.

The major upgrade of Fort Terry's fire control system between 1912 and 1914 with the introduction of searchlights, fire control stations and telephone communications, required a source of electricity as did the expansion of the post facilities during the same period.

The Electric Power Plant, Building No. 62, was constructed at Plum Gut Harbor in 1912. This central power plant, constructed of concrete, housed a coal-fired steam generator. In 1913 a 40' x 150' Coal Handling and Storage Plant, Building No. 65, was constructed nearby and included a conveyor for transporting coal from the dock to the plant.

With introduction of the five searchlights in 1912 two new power plants were constructed and the power plant of Battery Stoneman was outfitted with new equipment. The South Hill Power Plant, constructed in 1912, housed two gasoline generators to provide electricity for Searchlights Nos. 13 and 14 on South Hill. This power plant had a steel frame covered with cement plaster panels. The Pine Point Power Plant, also built in 1912, housed one gasoline generator to provide electricity for Searchlight No. 15. The power plant of Battery Stoneman received three new gasoline generators in 1911. Electric current from Battery Stoneman illuminated Searchlights Nos. 11 and 12 at East Point.

## Fort Terry Post Buildings

### Post Buildings, 1898 - 1901

While construction was underway on the first batteries at Fort Terry, the cantonment area for the garrison was being planned. A photograph in the National Archives dated July 1898 depicts two surveyors standing by a transit on the plateau where the post buildings would be constructed around a parade ground.

This plateau was at the west end of the 1897 land purchase on Plum Island and was the only large, level area suitable. Construction began in the fall of 1898 on ten buildings arranged around a parade ground. These initial ten buildings were completed by March 1899 and were occupied by Company I, Fourth Artillery by the summer of 1899. At this time only Battery Steele and Battery Kelly were armed.

A collection of photographs preserved at the National Archives document construction of the original complex of ten post buildings around the parade ground. Four photographs taken on September 29, 1898 record construction underway on all ten original buildings with the exception of the Barracks. The photographs show these to be balloon-frame buildings with diagonal board sheathing constructed on stone foundations or brick piers.

The Quarter Master's inventory forms indicate that the first ten Fort Terry post buildings completed by March 29, 1899 were:

Building No. 1	Officer's Quarters
Building No. 2	Officer's Quarters
Building No. 3	N.C.S. Quarters
Building No. 4	Barracks
Building No. 5	Administration
Building No. 6	Guard House
Building No. 7	Quarter Master's Storehouse
Building No. 8	Quarter Master's Stables
Building No. 9	Shops
Building No. 10	Bakery

The photographs and the 1926 "Post and Reservation Map, Fort Terry, New York" show these early buildings arranged on three sides of the parade ground which was approximately 300' x 400'. The location of the original parade ground is documented today by Building No. 47, which borders it at the southwest corner.

The parade ground was open to the north where it overlooked Long Island Sound.

On the west side of the parade ground were two Officers Quarters which are depicted on an undated photograph in the National Archives entitled "Captain's Quarters." These two-story, gable-roofed dwellings had shingled exteriors, wide porches, louvered window shutters and such decorative features as Palladian-motif and oval windows.

On the south side of the parade ground was the enlisted men's barracks shown in an undated photograph in the National Archives entitled "Barrack." This building had a long, narrow plan with two wings extending from the rear (south) wall. A two-story porch across the entire north wall faced the parade ground.

On the east side of the parade ground were the Non-Commissioned Officer's Quarters, Administration Building, Quarter Master's Storehouse, Guard House, Shops, Bakery and Stables.

The Quarter Master's inventory forms dated March 1, 1905 provide information on these ten 1899 buildings which indicate the size of the original Fort Terry garrison. The two double officer's quarters provided housing for the captain and lieutenants. Quarters No. 3 provided housing for two non-commissioned officers. The enlisted men's barracks had a capacity of 65 men.

Some information on the first year of the Fort Terry garrison is provided by an article in the *Brooklyn Eagle* of August 7, 1899. Following a yellow fever outbreak at Fort Munroe, Virginia, 260 soldiers were transported to Fort Terry for observation and quarantine:

The transport cast anchor about one-quarter of a mile from the government pier near the headquarters and the three batteries, N, O and G...Immediately upon arrival the soldiers were sent in heavy marching order to the parade ground in front of the Plum Island headquarters where tents were pitched. ...Company I, Fourth Artillery, was removed from Plum Island yesterday to make room for the new comers.

In March 1901 two frame N.C.O. Quarters, Buildings Nos. 15 and 18, identical in plan to the 1899 N.C.O. Quarters, Building No. 3, were added to the east side of the parade ground. The small plateau on which the parade ground was sited prevented much additional expansion in this area.

#### Post Buildings, 1901 - 1906

With the War Department purchase of 690 acres on June 24, 1901, Fort Terry comprised all of Plum Island with the exception of the lighthouse reservation. The new purchase provided an ideal site for a new cantonment area nearby the original one. From the foot of the plateau of the 1898 parade ground, a wide plain extended along Gardiner's Bay for a distance of one half mile. This plain was to become the new parade ground and most new post buildings were constructed around it.

Construction soon began on the first buildings at the new site and the brick Hospital and Hospital Steward's Quarters, Buildings Nos. 14 and 17, were completed by October 1901. These were also the first post buildings at Fort Terry having stone foundations, brick walls and slate roofs.

Construction of the Hospital was followed by frame quarters for officers and enlisted men on the north side of the new parade ground. Building No. 20, a Barracks with a

capacity of 109 men, Building No. 21, Captain's Quarters and Building No. 22, Captain's Quarters were all completed in 1902. In 1905 another Barracks, Building No. 26, was built next to its twin, Building No. 20.

Three post buildings with stone foundations, brick walls and slate roofs were built on the east side of the new parade ground between 1904 and 1906: Building No. 28, Post Exchange and Gymnasium, Building No. 37, Commissary Store House and Building No. 38, Quarter Master's Workshop.

This expansion of the cantonment area between 1901 and 1906 was associated with construction of the seven new batteries during this period.

#### Post Buildings, 1909 – 1912

These three years saw the most ambitious construction program of post buildings which included two large brick barracks, seven brick officer's quarters, a reservoir and electric power plant. All these buildings had stone foundations, brick walls and slate roofs with the exception of: the concrete reservoir and power plant and the frame crematory and well pump house. The buildings of this period included:

Building No. 44, Bakery, east side of the parade ground, 1909  
Building No. 45, N-C-O Quarters, old parade ground, 1910  
Building No. 46, N-C-O Quarters, old parade ground, 1910  
Building No. 47, Firemen's Quarters, old parade ground, 1910  
Building No. 48, Crematory, north and west of parade ground, 1910  
Building No. 49, Post Exchange, east side of the parade ground, 1910  
Building No. 51, Field Officer's Quarters, north side of parade ground, 1910  
Building No. 52, Field Officer's Quarters, north side of parade ground, 1910  
Building No. 53, Field Officer's Quarters, north side of parade ground, 1910  
Building No. 54, Barracks, east side of parade ground, 1910  
Building No. 55, Barracks, east side of parade ground, 1910  
Building No. 57, N-C-O Quarters, old parade ground, 1910  
Building No. 59, Well Pump House, west of parade ground, 1911  
Building No. 60, Quarter Master's Storehouse, east side of parade ground, 1911  
Building No. 61, Jerome Reservoir, Jerome Hill north of parade ground, 1912  
Building No. 62, Electric Power Plant, Plum Gut Harbor, 1912  
Building No. 63, Guardhouse, east side of parade ground, 1912

At the completion of this building program the cantonment area at Fort Terry was fully developed. Officer's Row was on the north side of the parade ground. Enlisted men's barracks bordered the east end of the parade ground. Other post buildings including the Hospital, Gymnasium, Commissary Storehouse, Quarter Master's Workshop, Bakery, Post Exchange, Quarter Master's Store House and Guard House were at the east end of the parade ground. A secondary complex of quarters for non-commissioned officers and enlisted men remained around the old parade ground. Service buildings including the Reservoir, Well Pump House, Electric Power Plant and Crematory were at outlying locations.



This expansion of the post buildings must also have been associated with construction of the 1903-1906 batteries, expansion of the submarine mine program with construction of the 1911 Combined Torpedo Storehouse and Cable Tanks and expansion of the infrastructure with excavation of Plum Gut Harbor in 1911, the electric system and water system.

#### Post Buildings, 1916 - 1918

The large number of temporary quarters constructed during the World War I era appears to indicate that Fort Terry became a training camp for new Army recruits. Sixteen one-story, frame quarters were built along the west side of the parade ground and at least twenty two-story, frame quarters were built at the east end of the parade ground, behind Building No. 55, Barracks. These buildings are seen in an aerial photograph dated July 10, 1924. By the time the 1926 "Post and Reservation Map, Fort Terry, New York" was made, the temporary quarters to the east had been demolished. The temporary quarters at the west end of the parade ground had been demolished by the time the "Fort Terry, Camp Development Plan" was drawn on July 3, 1941.

Covering 840 acres, Fort Terry was the largest fort in the Defenses of the Eastern Entrance to Long Island and may have been the largest in the New York area. The expansive parade ground provided an ideal site for a training camp. Fort Terry's batteries also allowed artillery training.

Construction during this period also included the 1916 brick Building No. 66, Officer's Quarters, on Officer's Row, the 1916 addition to the Hospital and the 1918 brick Building No. 115, Pump House, below Jerome Reservoir.

#### Post Buildings, 1941

Fort Terry again became a training facility for Army recruits during the World War II era. A large number of temporary buildings associated with this use were transferred on May 14, 1941. These were built in the vicinity of the parade ground and at a new complex developed on the stretch of level land leading to East Point.

Almost all of these new temporary buildings, numbered T-200 through T-236, shared the same construction: concrete pier foundations; wood frames with light members; pine clapboard exterior walls; and felt paper roof coverings.

These buildings included: eleven two-story barracks, each with a capacity of 63 men; four mess halls; four company day rooms; one officer's quarters; two officer's mess; a chapel (Building No. T-232); a theater; a recreation building; and a fire station. In addition three concrete-block power plants were built (Buildings Nos. T-226, T-227 and T-228).

All of the older post buildings remained in use during the World War II era with the possible exception of the early frame buildings. The Combined Torpedo Storehouse and Cable Tanks was transferred to the Quarter Master to be used as a barracks with a capacity for 199 men.



## **HISTORIC OVERVIEW – PLUM ISLAND ANIMAL DISEASE CENTER, 1952 - 1998**

The U.S. Army Chemical Corps began planning an animal disease research laboratory on Plum Island in 1951. By the time the Chemical Corps plans for constructing a laboratory in the Combined Torpedo Storehouse and Cable Tanks (Building No. 257) and renovating other Fort Terry buildings were contracted for in the summer of 1952, the Chemical Corps had already agreed to turn the facility over to the Department of Agriculture, Bureau of Animal Industry.

The Chemical Corps officially took over Plum Island on April 25, 1952 and oversaw construction of the containment laboratory in Building No. 257 and remodeling of eighteen Fort Terry buildings into personnel quarters, administrative offices and other support facilities. On May 26, 1954, at the completion of the contracted work, the Chemical Corps Plum Island facility was officially deactivated.

The Department of Agriculture had been authorized by Congress in 1948 to construct a laboratory to study foot-and-mouth disease. When funds were finally appropriated in June 1952, a decision had been made for the Department of Agriculture to take over the Plum Island project which had just been established by the Chemical Corps.

Planning for an entirely new research laboratory to be built on Plum Island by the Department of Agriculture began in 1953 and was contracted on June 10, 1954. The Army officially transferred Plum Island to the Department of Agriculture on July 1, 1954 just as construction on the new Building No. 101 Laboratory compound began.

Although the Army Chemical Corps had possession of Plum Island for two years and initiated construction of a research laboratory, the Chemical Corps never occupied that laboratory. The Department of Agriculture was named to take over the facilities just as construction began. Therefore the entire history of the animal disease research laboratory can be considered under the single heading of the Department of Agriculture's Plum Island Animal Disease Center.

### **U.S. Army Chemical Corps on Plum Island, 1952 - 1954**

In 1952 Fort Terry, which had been on inactive status since 1948, was "established as a Class II Command Installation under the Jurisdiction of the Chief Chemical Officer" by General Orders No. 45 dated April 25, 1952.

The earliest indication of the Chemical Corps intention to develop an animal disease research laboratory on Plum Island is a set of architectural plans dated October 29, 1951. The plans "Biological Laboratories – Offshore Facilities," drawn by The Ralph M. Parsons Co., Los Angeles, for the Chemical Corps, U.S. Army, Camp Dietrich, Maryland, detail an ambitious facility with a new laboratory at the site of the 1954 Building No. 101, residences, a school and an air strip on the parade ground.

The Chemical Corps scaled back their plans and instead of building new facilities determined to renovate existing Fort Terry structures. The new laboratory was planned to be housed within the 1911 Combined Torpedo Storehouse and Cable Tanks. The April 30, 1952 plans, "Rehabilitation and Alteration of Existing Facilities , Building No. 257 (Laboratory)," were also drawn by the Ralph M. Parsons Co.

The job of designing support services for the Plum Island laboratory and housing for the Chemical Corps personnel was given to the New York firm of Alexander D. Crossett & Associates, Architect - Engineer. The Crossett plans entitled "Rehabilitation and Alteration of Existing Facilities" were approved on May 15, 1952 by Colonel G.H. Davidson, Jr., the New York District Engineer of the U.S. Army Corps of Engineers. The 84 sheets of drawings include new roads, a renovated water system, a submarine electric cable from Orient Point and the renovation of eighteen Fort Terry buildings to provide housing and services for the personnel and warehouses, feed storage and maintenance facilities for the laboratory.

Construction of the new laboratory complex at Building No. 257 and renovation of the Fort Terry buildings was undertaken by the Peter Reiss Company of Brooklyn for a contract amount of \$3,954,000. Just as construction began in the summer of 1952, the Chemical Corps agreed to turn the completed facility over to the Department of Agriculture. The plans for Building No. 257, Laboratory, were signed "Record Drawing of Work-As-Built" on March 15, 1954. A series of photographs taken in February 1954 show renovations to the Fort Terry post buildings to be completed. On July 1, 1954 the Department of the Army officially transferred Plum Island to the Department of Agriculture. By this time Department of Agriculture scientists were working in the new laboratory and their families were living in the renovated housing.

#### **U.S. Department of Agriculture, Planning an Animal Disease Research Laboratory, 1947 - 1954**

An outbreak of foot-and-mouth disease in Mexico in December 1946 created the sense of emergency which prompted Congress to authorize the Department of Agriculture, Bureau of Animal Industry, to construct a research facility to study the disease. But it was not until another outbreak occurred in Canada in 1952 that Congress appropriated the necessary funds for the new laboratory.

The United States immediately became involved in the effort to control the 1946 outbreak in Mexico. Congress established the Joint Mexican-United States Commission for the Eradication of Foot-and-Mouth Disease on February 28, 1947. A co-director of this commission was Dr. Maurice S. Shahan of the U.S. Department of Agriculture, Bureau of Animal Industry. Dr. Shahan became the founding director of the Plum Island Animal Disease Laboratory in 1952 and his experience on the Mexican-United States Commission can be seen as a starting point in the planning which led to the Plum Island facility.

A Department of Agriculture report entitled "Recommendations as to Projected Research to be Conducted by the Bureau of Animal Industry on Foot-and Mouth Disease" issued on October 21, 1947 noted: "The seriousness of the Mexican foot-and mouth-disease situation emphasizes the importance of immediately initiating action to institute a research program designed to increase our knowledge of the disease." This report formed the basis for Public Law 496 adopted by Congress on April 24, 1948:

The Secretary of Agriculture is authorized to establish research laboratories...for research and study,...of foot-and-mouth disease and other animal diseases which in the opinion of the Secretary constitute a threat to the livestock industry of the United States: Provided, That no live virus of foot-and-mouth disease may be introduced for any purpose into any part of the mainland United States except coastal islands separated therefrom by waters navigable for deep-water navigation..."

A November 1948 Department of Agriculture report to the Senate Committee on Appropriations entitled "Measures for Maintaining the United States Free from Foot and Mouth Disease of Livestock, with Special Reference to Research Needs" explained the urgency for funding a research laboratory:

The work in Mexico is being pushed relentlessly and every advantage will be taken of new information concerning the disease which may help in the eradication process. Such information may come from two sources: (1) the observations in the field, and (2) the work of research scientists. The Bureau of Animal Industry has sent several scientists to the established foot-and-mouth disease research laboratories in Europe to conduct initial studies and to make sure that none of the information brought to light in the work of these laboratories in foreign countries may have been overlooked.

The Department of Agriculture scientists, including Dr. Shahan, visited the British Research Institute; the State Veterinary Research Institute, Amsterdam, Holland; The Danish Foot-and-Mouth Disease Research Institute, Lindholm, Denmark; and the Swiss Federal Vaccine Institute, Basle, Switzerland.

A summary of the proposed "U.S. Foot-and-Mouth Disease Research Laboratory" submitted by the Department of Agriculture indicates that the facility constructed on Plum Island between 1954 and 1956 by the Department of Agriculture was conceptualized by 1948. This report describes the safety requirements of the Building No. 101 Laboratory compound: isolation on an island; a laboratory in a walled compound; a sealed laboratory envelope; concrete and glass block construction for easy disinfecting; the requirement for personnel to shower in and out of the laboratory; the incineration of animal carcasses and other solid wastes; the sterilization of all liquid wastes; the control of air distribution and decontamination of exhaust air by a system of electrical and mechanical filters; a first floor with 48 large animal isolation units and laboratory facilities; and a second floor for mechanical equipment and feed distribution. The report also forecast "about 400 to 450 employees will be required - 300 workers engaged in research activities, together with guards, mechanics, boiler operators, janitors, cafeteria employees, business personnel, etc. Experiments will require about 1,200 cattle, 50 sheep, 50 goats, 24 horses, 300 hogs, 30,000 guinea pigs, 2,000 mice, 400 hamsters, and 1,000 rats each year."

Undoubtedly Dr. Maurice S. Shahan was instrumental in designing the proposed laboratory and the design was informed by the tour of European animal disease research laboratories. A 1952 Department of Agriculture press release also noted that some of the safety requirements were "developed during the war years, many of which are used in the National Institute of Health at Bethesda, Md."

Congress did not fund the authorized Department of Agriculture laboratory in 1948.

A Department of Agriculture press release, dated March 4, 1952, reported Dr. Shahan's observations on the outbreak of foot and mouth disease in Saskatchewan. This threat from Canada brought the issue to the fore again and provided the political incentive for Congress to fund the Department of Agriculture, Bureau of Animal Industry's proposed research laboratory. Ten million dollars for the laboratory were included in the Urgent Deficiency Act of 1952, signed by President Truman on June 30, 1952. Only a week later, on July 3, 1952, Secretary of Agriculture Brannan announced public hearings on establishing the animal disease research laboratory on Plum Island, New York. Following a series of public hearings Secretary Brannan announced on July 28, 1952 the official selection of Plum Island. Dr. Maurice S. Shahan, the Director of Foot-and-Mouth Disease Research, Bureau of Animal Industry, was named the director of the new facility.

Dr. Shahan and others at the Bureau of Animal Industry must have begun at once to work with the Chemical Corps and the Corps of Engineers to coordinate planning of renovations and new construction on Plum Island. Architectural plans continued to be routed through the Corps of Engineers, New York District, and the Chemical Corps. The appearance in 1953 of the New York architecture and engineering firm Vitro Corporation of America as the planners of what would become the USDA laboratory must have been initiated by Dr. Shahan. The first plans by Vitro Corporation "Fort Terry, Design of Facilities, Army Program FY - 1954 , Preliminary", dated March 18, 1953, included the new Building No. 101 Laboratory, new quarters for personnel, a community building and a school.

By the time the final plans were drawn by Vitro Corporation in August 1953 the proposed dwellings and community buildings had been dropped. The final plans included only the new laboratory compound and support facilities: Building No. 101 Laboratory, Building No. 102, Decontamination Building, Building No. 103, Steam and Emergency Power Plant, the Salt Water Pump House; fuel oil storage and the dock guardhouse. These plans were approved on March 15, 1954 by Dr. Maurice S. Shahan and by Colonel A. H. Davidson, Jr., the New York District Engineer. By this time the Chemical Corps was no longer involved.

#### **U.S. Department of Agriculture, Construction on Plum Island, 1954 - 1956**

The Department of Agriculture announced on June 10, 1954 that the construction contract for the Plum Island Animal Disease Laboratory had been awarded to the Stock Construction Corporation, New York, for \$7,712,000. The statement noted that "construction will be under supervision of Col. Alfred H. Davidson, Jr., New York District Engineer, U.S. Army Corps of Engineers. Colonel Davidson has been

active in development of plans and specifications for the laboratory." Col. Davidson was involved in the earliest plans of the Chemical Corps in 1951. He and Dr. Shahan appear to have been principally responsible for guiding the design of the new facility.

The Department of the Army officially transferred Plum Island to the Department of Agriculture on July 1, 1954 just as construction began on the Building No. 101 Laboratory compound. At this time Bureau of Animal Industry scientists were already working in the Building No. 257, Laboratory, built by the Chemical Corps. The Department of Agriculture held a press tour of Plum Island on July 8, 1954 which was reported in The Wall Street Journal on July 13, 1954:

So great has been the horror of foot and mouth disease, the U.S. has never permitted research with the virus within our continental boundaries. The U.S. Department of Agriculture, however, has spent about \$130 million fighting the ailment on foreign soil since 1948.

The laboratory which has just been put into use was equipped by the Army Chemical Corps in a converted explosives warehouse in 1952. It was taken over by the Agricultural Research Service July 1. Washington policymakers saw duplication between ARS and the Chemical Corps and decided to combine the foot and mouth experiments of the two. The Chemical Corps is conducting at other locations classified work on defense against animal diseases that might be introduced by enemy action.

Clearing of land for construction of a second laboratory building to cost about \$8 million began last week.

Thirty scientists and 120 operating personnel are on the island now. Within 18 months, the total will rise to 300. This staff expects to use annually 25,000 guinea pigs, 52,000 mice and thousands of chickens, rabbits, cattle, hogs, sheep and horses in their research.

Dr. M.S. Shahan, a government animal scientist since 1926, heads the Plum Island project. His acquaintance with F&M dates back to a 1929 outbreak of the malady in California. He was the first co-director of the joint United States-Mexico Commission on Foot and Mouth Disease in 1946 and later had charge of the foot and mouth research in Mexico, Great Britain and continental Europe in 1948.

The Plum Island laboratory has two basic aims: to develop diagnostic techniques and provide facilities for quick identification, so control measures can be instituted immediately in case of an outbreak; and to develop more effective vaccines than those now available.

The Department of Agriculture's new Plum Island Animal Disease Laboratory Building No. 101 compound, was dedicated on September 26, 1956.



## Plum Island Animal Disease Center, 1956 - 1998

This account of the history of the Plum Island Animal Disease Center (PIADC) focuses on the use of the Fort Terry buildings and structures during this period.

The centerpiece of the new facility was the research laboratory compound: Building No. 101, Laboratory; Building No. 102, Decontamination; and Building No. 103, Steam and Emergency Power Plant. The other new buildings included Building No. 35, Dock Guard House; Building No. 258, Guard House at Building No. 257, Laboratory; Building No. 65 and Building No. 67, the two re-constructed warehouses at the dock; the Salt Water Pump House; and the Water Tower.

Most of the laboratory support facilities were housed within existing Fort Terry buildings as planned by the Chemical Corps and designed by Alexander D. Crossett & Associates, Architect – Engineer in 1952.

All of the eighteen Fort Terry buildings renovated by the Chemical Corps in 1952 – 1954 were occupied by PIADC, although some were put to different uses than planned by the Chemical Corps. The 1955 – 1956 building program included additions to three of these buildings: the generator and vehicle repair wings to Building No. 38; the small animal colony addition to Building No. 60; and the small animal colony addition to Building No. 63. These were the only major additions to the Fort Terry buildings during the PIADC era.

Below are listed the Fort Terry buildings renovated by the Chemical Corps in 1952 – 1954 according to the “Rehabilitation and Alteration of Existing Facilities” plans by Alexander D. Crossett & Associates. The proposed Chemical Corps use identified on the Crossett plans and the actual use by the Department of Agriculture are noted.

	Fort Terry	Chemical Corps	PIADC
Building No. 13	Tailor Shop	Fire Station	Fire Station
Building No. 14	Hospital	Administration	Administration
Building No. 37	Commissary	Warehouse	Warehouse
Building No. 38	Q. M. Workshop	Motor Pool	Motor Pool
Building No. 44	Bakery	Communications	Warehouse
Building No. 45	N-C-O Quarters	Housing	Housing
Building No. 46	N-C-O Quarters	Housing	Housing
Building No. 47	Fireman's Quarters	Housing	Housing
Building No. 49	Post Exchange	Cafeteria	Cafeteria
Building No. 51	Officer's Quarters	Housing	Housing
Building No. 52	Officer's Quarters	Housing	Housing
Building No. 53	Officer's Quarters	Housing	Housing
Building No. 54	Barracks	Housing	E & PM
Building No. 55	Barracks	Housing	Emergency Housing
Building No. 60	Q. M. Storehouse	Commissary	Small Animal Colony
Building No. 63	Guard House	Administration	Small Animal Colony

Building No.115	Fire Pump House	Same	Same
Building No. T 232	Chapel	Assembly Hall	Assembly Hall

Initially families of PIADC staff lived on Plum Island in the renovated officers quarters on Officer's Row and at the old parade ground. An article in the October 27, 1955 issue of *Newsday* reported that fifteen families were living on Plum Island and that ten children took the ferry to school in Orient each day. This practice eventually subsided and the former Officer's Quarters were abandoned. The following empty Officer's Quarters were demolished between 1961 and 1963:

- Building No. 45, N-C-O Quarters, old parade ground, 1910
- Building No. 46, N-C-O Quarters, old parade ground, 1910
- Building No. 51, Field Officer's Quarters, Officer's Row, 1910
- Building No. 52, Field Officer's Quarters, Officer's Row, 1910
- Building No. 53, Field Officer's Quarters, Officer's Row, 1910
- Building No. 57, N-C-O Quarters, old parade ground, 1910
- Building No. 66, Officer's Quarters, Officer's Row, 1916

The only Fort Terry dwelling not demolished was the 1910 Building No. 47, Firemen's Quarters, which continues to be used for housing.

PIADC used the Fort Terry batteries as animal supply facilities for both large and small animals. The 1953 and 1954 plot maps indicate the following uses of the batteries and the 1920 Mining Casemate:

Battery Stoneman	Large Animal Area
Battery Steele	Large Animal Area
Battery Robert Floyd	Large Animal Area
Battery Bogardus Eldridge	Large Animal Area
Battery Henry Campbell	Guinea Pig Area
Battery John Greble	Guinea Pig Area
Mining Casemate, 1920	Guinea Pig Area

Alterations for use as large animal holding areas were usually limited to the introduction of fencing. Some interior alterations accompanied the use of the batteries as guinea pig breeding facilities. The most extensive alterations were to the interior of the 1921 Mining Casemate. Animal fencing at Battery Bradford, Battery Justin Dimick and Battery James Dalliba indicate that these were also used at one time as large animal holding areas. This use of the batteries continued into the 1970s and 1980s. Photographs of this period show the batteries to be well maintained and the vegetation surrounding them to be controlled.

Planning to modernize the Plum Island Animal Disease Center began in 1977 with the *Plum Island Animal Disease Center Master Plan* by the Perkins & Will Partnership, an architectural firm. The *Master Plan* recommended constructing new facilities to house most of the functions being housed in the Fort Terry post buildings and batteries.

A combination of events which included construction of new animal supply facilities, a decreased need for large laboratory animals, and a foot and mouth disease

outbreak on Plum Island in 1978, led to abandonment of the large animal holding facilities in the batteries. These were abandoned in the 1970s and 1980s and began to become overgrown. Significant deterioration of the batteries began about this time due primarily to the invasion of vegetation.

Changes in research programs and in animal supply policy led to decreased use of the small animal areas and this use of Building No. 60, Building No. 63, the 1921 Mining Casemate and the batteries was abandoned by 1980. Building No. 63 was then converted into the PIADC Library.

The most significant development for the Fort Terry post buildings was the consolidation of all administrative facilities in the new Building No. 100 completed in 1995. Six of the brick post buildings in the parade ground complex were abandoned when their functions were relocated in Building No. 100.

PIADC initially occupied and maintained eighteen Fort Terry post buildings, the Combined Torpedo Storehouse and Cable Tanks, the 1921 Mining Casemate and most of the batteries. Today all of these are abandoned with the exception of: Building No. 13, Fire Station; Building No. 38, Motor Pool, Building No. 47, Housing.

**EXISTING CONDITIONS OVERVIEW –  
PROPERTIES ASSOCIATED WITH PLUM ISLAND’S  
AGRARIAN ECONOMY, 1700s and 1800s**

There are no extant buildings or structures associated with Plum’s Island’s agrarian economy in the period before Fort Terry was established. The sites of the Beebe/Jerome farmstead and the Tuthill/Clark farmstead were inspected but are heavily overgrown. No foundations or any other evidence of these farms was found.

A headstone with the inscription “COL. THOMAS GARDINER, 1724 – 1786, SON OF JOHN GARDINER OF NARRAGANSETT” is at the foot of a high bank approximately 1000’ north of the lighthouse. The reason for this siting is not known. The granite headstone is more recent than 1786 and may have replaced an original marker.

**EXISTING CONDITIONS OVERVIEW –  
PROPERTIES ASSOCIATED WITH THE PLUM ISLAND LIGHT STATION,  
1826 - 1948**

Three structures associated with the Plum Island Light Station remain on the 1826 three-acre lighthouse reservation at the northwest point of the island:

Plum Island Lighthouse

Plum Island Light Station Oil House

Plum Island Light Station Storage Shed

On a timber framework at the Plum Island Harbor breakwater is the fog bell which had operated at the lighthouse reservation:

Plum Island Light Station Fog Bell

The fourth order lens, pedestal and clockworks mechanism from the Plum Island Lighthouse is at the East End Seaport and Marine Foundation in Greenport, New York.

## EXISTING CONDITIONS OVERVIEW – PROPERTIES ASSOCIATED WITH FORT TERRY, 1897 - 1948

The Historic Overview of Fort Terry for the period 1897 – 1948 was organized following the principal functions of a seacoast fortification set forth in the 1906 “Taft Board Report” as follows: Batteries; Submarine Mines; Fire Control; Searchlights; and Power Plants. The history of the Fort Terry Post Buildings was presented separately. This Existing Conditions Overview follows the same organization.

### Batteries

Thirteen batteries were inspected on Plum Island. The following list of these batteries includes the original armament, now removed, and the date of transfer:

Battery	Original Armament	Date of Transfer
Battery Steele	two 10" B.L. Rifles	March 31, 1900
Battery Kelley (Emplacement No. 1)	one 4.7" R.F. Gun	March 31, 1900
Battery Kelly (Emplacement No. 2)	one 5" R.F. Gun	March 4, 1901
Battery Stoneman	eight 12" B.L. Mortars	March 4, 1901
Battery Bradford	two 6" R.F. Guns	March 4, 1901
Battery Justin Dimick	two 6" B.L. Rifles	August 31, 1905
Battery Robert Floyd	two 6" B.L. Rifles	November 22, 1906
Battery Henry Campbell	two 3" F.F. Guns	August 28, 1905
Battery James Dalliba	two 3" R.F. Guns	August 28, 1905
Battery John Greble	two 3" R.F. Guns	August 28, 1905
Battery Bogardus Eldridge	two 3" R.F. Guns	November 22, 1906
Unnamed, at Battery Steele	four 155mm guns	October 26, 1940
Anti Motor Torpedo Boat No. 911	two 90-mm guns	December 20, 1943
Battery Construction No. 217	two 6" guns	July 1, 1944

The thirteen batteries are at three locations on Plum Island: East Point; the high ground at the east end of Plum Island, where the grade rises from the isthmus leading to East Point; and Pine Point. The distribution of the batteries is:

#### East Point

Battery Kelly No. 1 Emplacement	one 4.7" R.F. Gun	March 31, 1900
Battery Kelly No. 2 Emplacement	one 5" R.F. Gun	March 4, 1901
Battery Stoneman	eight 12" B.L. Mortars	March 4, 1901
Battery Bradford	two 6" R.F. Guns	March 4, 1901
Battery Justin Dimick	two 6" B.L. Rifles	August 31, 1905
Battery Henry Campbell	two 3" F.F. Guns	August 28, 1905



Battery James Dalliba	two 3" R.F. Guns	August 28, 1905
Battery John Greble	two 3" R.F. Guns	August 28, 1905
Battery Construction No. 217	two 6" guns	July 1, 1944
<u>East end of Plum Island</u>		
Battery Steele	two 10" B.L. Rifles	March 31, 1900
Unnamed, at Battery Steele	four 155mm guns	October 26, 1940
<u>Pine Point</u>		
Battery Robert Floyd	two 6" B.L. Rifles	November 22, 1906
Battery Bogardus Eldridge	two 3" R.F. Guns	November 22, 1906
Anti Motor Torpedo Boat No. 911	two 90-mm guns	December 20, 1943

The sites of the two World War I era anti-aircraft batteries are deep within densely overgrown areas of the island and were not visited. Each battery has two 18' diameter concrete gun blocks. It is assumed that the gun blocks of these two batteries remain intact:

Battery	Original Armament	Date of Transfer
A. A. Battery (near Battery Steele)	two 3" anti-aircraft guns	July 1918
A. A. Battery (near Jerome Reservoir)	two 3" anti-aircraft guns	January 1921

### **Submarine Mines**

Three structures remain that were associated with the submarine mining functions at Fort Terry. Fire Control Structures and Batteries, listed in their respective sections, were also associated with the Mine Command. The following list of these structures gives the date of transfer.

Mining Casemate	April 30, 1901
Combined Torpedo Storehouse and Cable Tanks	January 21, 1911
Bombproof Mining Casemate	April 6, 1921

The 1901 Mining Casemate is at the east end of the isthmus leading to East Point. The cable conduit from this casemate leads to the beach at Long Island Sound.

The 1911 Combined Torpedo Storehouse is on Pine Point, a short distance inland from the site of the 1906 South Wharf on Gardiner's Bay.

The 1921 Bombproof Mining Casemate is a short distance inland from the shore of Gardiner's Bay, approximately 400 yards north of the Combined Torpedo Storehouse and Cable Tanks.

The route of the railroad from Plum Gut Harbor to the Combined Torpedo Storehouse and Cable Tanks is evident today as a dirt roadway. Whether or not any of the tracks remain, buried in the ground, is not known.

## Fire Control

Thirty-one fire control structures were identified on Plum Island. The following list of these structures includes the date of transfer. The list is organized by the date of the earliest component of a combined station.

B.C. (Kelley)	March 4, 1901
F.C.	August, 1902
Combined C2 (Terry) F"5 (Stoneman) & Meteorological Station ( Renovated as No. 1-O, 1944)	March 20, 1914
Telephone and telautograph booths (Stoneman)	June 15, 1906
Telautograph booth (Steele)	June 15, 1906 (attributed)
Double Mine Primary Station M' 3 – M' 3	April 29, 1908
Mine Secondary Station, M"3	April 29, 1908
Base End Station M""3	1908 (attributed)
Base End Station F""5	1908 (attributed)
Base End Station F""4	1908 (attributed)
F'4, BC & P (Steele) (Site of B.C. (Steele), 1900)	March 20, 1914
P (Stoneman)	March 20, 1914
No. 1 - O (No. 1 – O on site of B.C. (Stoneman), 1902, and F'5, BC (Stoneman), 1914)	March 3, 1944
B', BC & P (Bradford)	March 20, 1914
CRF, BC & P (Floyd)	March 20, 1914
CRF & P (Kelly)	March 20, 1914
9' CRF (Eldridge)	March 20, 1914

Signal Corps Switchboard Room	March 20, 1914
Bombproof Shelter	September 30, 1920
BC (Campbell)	1914 (attributed)
BC (Greble)	1914 (attributed)
BC (Dalliba)	1914 (attributed)
BC (Eldridge)	1914 (attributed)
Radio Station	May 18, 1920
9' CRF (Campbell)	July 26, 1923
9' CRF (Greble)	July 26, 1923
SCR – 296A (Battery No. 217)	September 14, 1943
No. 1 – G	June 6, 1944
No. 1 – GG	June 6, 1944
No. 1 – P (Site of F"4 (Steele), 1914)	June 6, 1944
No. 1 – R P (Dimick), in magazine structure (Site of B', BC (Dimick), 1914)	March 3, 1944 March 20, 1914
No. 1 – S (Site of F'6, (Terry), 1914)	March 3, 1944
No. 1 – V	April 28, 1944
BC (Dalliba)	1944 (attributed)

Twenty-five of the thirty-one fire control structures are nearby the batteries at the three fortified areas of Plum Island. Sixteen fire control structures are on the heavily-fortified East Point. Three are in the vicinity of Battery Steele on the rise west of the isthmus leading to East Point. Six stations are on Pine Point. The locations of the thirty-one stations are:

#### East Point

B.C. (Kelley)	March 4, 1901
Telephone and telautograph booths (Stoneman)	June 15, 1906
P (Stoneman) No. 1 - O	March 20, 1914, March 3, 1944
B', BC & P (Bradford)	March 20, 1914
CRF & P (Kelly)	March 20, 1914
BC (Campbell)	1914 (attributed)
BC (Greble)	1914 (attributed)
BC (Dalliba)	1914 (attributed)
9' CRF (Campbell)	July 26, 1923
9' CRF (Greble)	July 26, 1923
SCR - 296A (Battery No. 217)	September 14, 1943
No. 1 - P	June 6, 1944
No. 1 - R	March 3, 1944
No. 1 - S	March 3, 1944
No. 1 - V	April 28, 1944
BC (Dalliba)	1944 (attributed)

#### Battery Steele vicinity

Telautograph booth (Steele)	June 15, 1906 (attributed)
F'4, BC & P (Steele)	March 20, 1914
Signal Corps Switchboard Room	March 20, 1914

#### Pine Point

Base End Station M''3	1908 (attributed)
Base End Station F''5	1908 (attributed)
Base End Station F''4	1908 (attributed)
CRF, BC & P (Floyd)	March 20, 1914
9' CRF (Eldridge)	March 20, 1914
BC (Eldridge)	1914 (attributed)

#### Signal Hill

F.C., Combined C2 (Terry) F''5 (Stoneman) & Meteorological Station	August 1902, March 20, 1914
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#### South shore at center of island

Double Mine Primary Station M' 3 - M' 3	April 29, 1908
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#### On Plum Gut south of lighthouse

Mine Secondary Station, M''3	April 29, 1908
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#### North of parade ground

Radio Station	May 18, 1920
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### Jerome Reservoir

No. 1 – G

June 6, 1944

No. 1 – GG

June 6, 1944

### **Searchlights**

Five shelters for searchlights were identified on Plum Island. The following list of these structures includes the date of transfer.

Shelter for Searchlight No. 7	1906 (attributed)
Shelter for Searchlight No. 11	September 12, 1912
Shelter for Searchlight No. 12	September 12, 1912
Shelter for Searchlight No. 13	September 12, 1912
Shelter for Searchlight No. 14	September 12, 1912

Three of the searchlights are on East Point and were associated with the fire control stations and batteries there. Two searchlights are on South Hill and appear to be associated with the Mine Command Primary Station on Gardiner's Bay.

#### East Point

Shelter for Searchlight No. 7	1906 (attributed)
Shelter for Searchlight No. 11	September 12, 1912
Shelter for Searchlight No. 12	September 12, 1912

#### South Hill

Shelter for Searchlight No. 13	September 12, 1912
Shelter for Searchlight No. 14	September 12, 1912

### **Power Plants**

The South Hill Power Plant is the only extant fortification power plant that was built as a separate structure. Power plants are also located within Battery Steele, Battery Stoneman, Battery Bradford and Battery Construction No. 217.

The South Hill Power Plant, transferred on September 12, 1912, is at the base of South Hill which is on the bluff of Gardiner's Bay at the east end of the parade ground.



## Fort Terry Post Buildings

Eighteen Fort Terry post buildings were identified on Plum Island. The following list of these structures includes the date of transfer.

Building No.	13	Tailor Shop	1901 (attributed)
Building No.	14	Hospital	1901 (attributed)
Building No.	37	Commissary Storehouse	June, 1906
Building No.	38	Quarter Master's Workshop	June, 1906
Building No.	44	Bakery	April 12, 1909
Building No.	47	Fireman's Quarters	July 5, 1910
Building No.	48	Crematory	January 20, 1910
Building No.	49	Post Exchange	July 5, 1910
Building No.	54	Barracks	October 27, 1910
Building No.	55	Barracks	November 28, 1910
Building No.	60	Quarter Master's Storehouse	August 10, 1911
Building No.	61	Jerome Reservoir	October 14, 1912
Building No.	63	Guard House	January 16, 1912
Building No.	115	Fire Pump House	October 30, 1918
Building No. T 226		Power Plant	December 20, 1940
Building No. T 227		Power Plant	January 10, 1941
Building No. T 228		Power Plant	February 10, 1941
Building No. T 232		Chapel	1941 (attributed)

Twelve buildings are grouped in a complex at the east end of the parade ground. Just above this group is Building No. 47 on the south side of the 1898 parade ground. Three service structures are along the north side of the parade ground. Building No. 48, Crematory, is at a remote spot on the north shore. Building No. T-228, Power House, is on the isthmus leading to East Point at the location of a World War II era temporary cantonment.

### East end of parade ground

Building No.	13	Tailor Shop	1901 (attributed)
Building No.	14	Hospital	1901 (attributed)
Building No.	37	Commissary Storehouse	June, 1906
Building No.	38	Quarter Master's Workshop	June, 1906
Building No.	44	Bakery	April 12, 1909
Building No.	49	Post Exchange	July 5, 1910
Building No.	54	Barracks	October 27, 1910
Building No.	55	Barracks	November 28, 1910
Building No.	60	Quarter Master's Storehouse	August 10, 1911
Building No.	63	Guard House	January 16, 1912
Building No. T 227		Power Plant	January 10, 1941
Building No. T 232		Chapel	1941 (attributed)

### 1898 parade ground

Building No.	47	Fireman's Quarters	July 5, 1910
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North of parade ground

Building No. 61 Jerome Reservoir  
Building No. 115 Fire Pump House  
Building No. T 226 Power Plant

October 14, 1912  
October 30, 1918  
December 20, 1940

North shore at center of island

Building No. 48 Crematory

January 20, 1910

Isthmus to East Point

Building No. T 228 Power Plant

February 10, 1941

## EXISTING CONDITIONS OVERVIEW – PROPERTIES ASSOCIATED WITH THE PLUM ISLAND ANIMAL DISEASE CENTER, 1952 - 1998

Thirty-four structures on Plum Island were constructed between 1952 and 1995 by the U.S. Army Chemical Corps or the Agricultural Research Service associated with the Department of Agriculture's Plum Island Animal Disease Center. Four buildings at Orient Point, Long Island, were constructed by the Agricultural Research Service. The following list of these buildings is organized by building number.

### Plum Island

Building No. 15, Chlorinator Building  
Building No. 21, Quarantine Building  
Building No. 22, Large Animal Holding Area and Corral  
Building No. 24, Composter  
Building No. 26, Electrical Substation  
Building No. 35, Dock Guard House  
Building No. 59 Well Pump House  
Building No. 61, Water Tower  
Building No. 62, Large Animal Holding  
Building No. 64, Boat House  
Building No. 65, Dock Warehouse  
Building No. 66, Kyle Breaker House  
Building No. 67, Dock Warehouse  
Building No. 68, Dock Repair Shop  
Building No. 69, Submarine Cable Terminal Building  
Building No. 91, Hay Storage  
Building No. 92, Shower and Change Room  
Building No. 93, Spray Wash  
Building No. 94, Administrative Waste Incinerator  
Building No. 100, Administrative Support Building  
Building No. 101, Laboratory and Animal Isolation Units Building  
Building No. 102, Decontamination Building  
Building No. 103, Steam and Emergency Power Plant  
Building No. 105, Waste Water Treatment Plant Control  
Building No. 106, Blower Building  
Building No. 107, Chiller Building  
Building No. 108, Switchgear Building  
Building No. 256, Electrical Substation  
Building No. 258, Guard House and Transfer Platform  
Building No. 259, Compound Tractor Shed  
TH Transformer House to Building No. 257  
SW Salt Water Pump House  
W Technical Warehouse  
T Tank Farm

### **Orient Point**

Building No. 1, Orient Point Office Building  
Building No. 2, Orient Point Warehouse and Garage  
Building No. 3, Orient Point Truck Terminal  
Building No. 5, Orient Point Breaker House

Most of the PIADC buildings are grouped in areas of the island where there are no historic resources. An understanding of the relationship between the PIADC buildings and the historic buildings will help in assessing impacts and in determining boundaries of a potential historic district.

### **PIADC Buildings in areas where there are no historic resources**

#### Northwest quadrant of the island, in the vicinity of Building No. 101

Building No. 100, Administrative Support Building  
Building No. 101, Laboratory and Animal Isolation Units Building  
Building No. 102, Decontamination Building  
Building No. 103, Steam and Emergency Power Plant  
Building No. 105, Waste Water Treatment Plant Control  
Building No. 106, Blower Building  
Building No. 107, Chiller Building  
Building No. 108, Switchgear Building  
Tank Farm

#### Plum Island Harbor vicinity

Building No. 35, Dock Guard House  
Building No. 62, Large Animal Holding  
Building No. 64, Boat House  
Building No. 65, Dock Warehouse  
Building No. 66, Kyle Breaker House  
Building No. 67, Dock Warehouse  
Building No. 68, Dock Repair Shop  
Building No. 69, Submarine Cable Terminal Building  
Salt Water Pump House  
Technical Warehouse

### **PIADC Buildings in areas where there are historic resources**

#### On Road "B", from Main Road to Combined Torpedo Storehouse and Cable Tanks (Building No. 257).

Building No. 15, Chlorinator Building  
Building No. 21, Quarantine Building  
Building No. 22, Large Animal Holding Area and Corral  
Building No. 24, Composter  
Building No. 26, Electrical Substation  
Building No. 256, Electrical Substation

Building No. 258, Guard House and Transfer Platform  
Building No. 259, Compound Tractor Shed  
Transformer House to Building No. 257

Battery Steele vicinity

Building No. 91, Hay Storage  
Building No. 92, Shower and Change Room  
Building No. 93, Spray Wash  
Building No. 94, Administrative Waste Incinerator

Jerome Hill

Building No. 61, Water Tower

South of Main Road at east end of island

Building No. 59 Well Pump House



## **EVALUATION OF PROPERTIES ASSOCIATED WITH THE PLUM ISLAND LIGHT STATION, 1869 - 1948**

The Plum Island Lighthouse was determined eligible for listing on the State and National Registers by the New York State Historic Preservation Office. The following assessment is intended to complement that determination by providing additional information gathered by this survey.

### **Plum Island Lighthouse**

The Plum Island Lighthouse is historically significant as part of the system of aids to navigation through the eastern entrances to Long Island Sound built by the Federal government from 1806 to 1899 and remaining active today. This system of lighthouses had regional significance aiding the coastal trade of New York, Connecticut, Rhode Island and Massachusetts. The Plum Island Lighthouse was built in 1869 and remained a manned station until it was deactivated in 1978.

The historic context represented by the lighthouse is directly related to the Fort Terry historic context: "Coast Defenses of the Eastern Entrance to Long Island Sound, 1897 - 1948". Both recognize the significance of navigation into and within Long Island Sound to the commerce of New York City, Long Island and Connecticut.

The Plum Island Lighthouse is architecturally significant as one of six examples of the Third Light-House District's standard plan for a fourth order lighthouse: the 1867 Block Island North Lighthouse, the 1868 Norwalk Island Lighthouse (Conn.), the 1868 Great Captain Island Lighthouse (Conn.), the 1868 Morgan Point Lighthouse (Conn.), the 1868 Old Field Point Lighthouse (N.Y.) and the 1869 Plum Island Lighthouse.

In the 1860s when the engineers of the Third Lighthouse District applied the new technology of the Fresnel lens to the system of lighthouses in Long Island Sound and Block Island Sound it was apparent that the fourth order lens was appropriate for many locations. The engineers designed a new fourth order lighthouse which became the principal architectural contribution of the Third Lighthouse District during the important early period to the Light House Board when the nation's system of aids to navigation was modernized.

This group of six regional fourth-order lighthouses successfully join lighthouse function with architectural style. These are one of the first important series of integral lighthouses, with the tower rising from the roof of the keeper's dwelling. Their design in the Italianate style is complemented by the tower mounted on the roof. The design is distinguished by the rock-faced granite walls simply articulated by quoins and arched granite window and door surrounds. The Italianate features of the cast iron tower include bold scroll brackets which anchor the tower to the masonry and bracketed cast iron window hoods and sills. The Plum Island Lighthouse retains a high degree of architectural integrity on the exterior.

### **Plum Island Light Station Oil House**

The ca. 1900 brick Oil House, on the lighthouse reservation, complements the setting of the lighthouse and contributes to its significance by illustrating the evolution in the technology of lamps and the fuel used to illuminate the lighthouse optic. The Oil House was constructed to store the mineral oil used by the Incandescent Oil Vapor lamps that were being installed in the lighthouses of the Third Light-House District in the first decade of this century.

### **Plum Island Light Station Storage Shed**

The ca. 1920 – 1926 Storage Shed, on the lighthouse reservation, contributes to the setting of the lighthouse. The Storage Shed was constructed during the period that the Plum Island Light Station was manned, but its exact use is not documented. The integrity is diminished by alterations to the doorway. Additional information is needed to assess the significance of the Storage Shed.

### **Plum Island Light Station Fog Bell**

The ca. 1871 Fog Bell was originally in a bell house on the lighthouse reservation. At some time before the bell house was lost to erosion the bell was removed. It is presently hung from a timber structure on the Plum Island Harbor breakwater where it still functions as a fog bell.

Although it is no longer located at the lighthouse reservation, the fog bell remains in use on Plum Island. The fog bell dates from the same period as the Plum Island Lighthouse and its fourth order Fresnel lens. The Fog Bell complements these resources by illustrating the second primary function of a light station: the fog signal. Because a fog bell of this period is an extremely rare survivor, the Plum Island Fog Bell is significant despite the loss of integrity of setting.

## EVALUATION OF PROPERTIES ASSOCIATED WITH FORT TERRY, 1897 - 1948

### Historic Context

The Fort Terry historic resources are associated with the historic context: **Coast Defenses of the Eastern Entrance to Long Island Sound, 1897 – 1948.**

Seacoast fortification has been a principle of defense against foreign attack throughout this nation's history. The larger historic context of coast defense throughout American history is contained in the authoritative work on the subject: *Seacoast Fortifications of the United States: An Introductory History* by Emanuel Raymond Lewis.

The historic context "Coast Defenses of the Eastern Entrance to Long Island Sound, 1897 – 1948" illustrates national themes within a particular geographic area. The chronological period of the historic context coincides with what is described in *Seacoast Fortifications* as the "Modern Era" which includes the following distinct periods of development beginning in 1885: Endicott and Taft Period; World War I Era; and World War II Era.

Dramatic technological improvements in armament in the late nineteenth-century posed both a threat to American security and an opportunity for defense. Foreign powers were developing the new technology and expanding their navies. The new armament also afforded the opportunity for much more powerful and effective seacoast fortifications. President Cleveland appointed a special board, headed by Secretary of War William C. Endicott, to study the potential developing threats to American security and the opportunities for coast defense. The 1886 "Endicott Board Report" served as the blueprint for the most ambitious construction program of seacoast fortifications in this nation's history.

Although the "Endicott Board Report" recognized the strategic importance of the entrance to Long Island Sound, no armament of that period was powerful enough to cover the five-mile-wide channel. When guns having the necessary range were developed in the mid-1890s, the War Department moved quickly to establish the Defenses of the Eastern Entrance to Long Island Sound. This system comprised five forts guarding all channels from Block Island Sound into Long Island Sound. The forts, listed from north to south, were

- Fort Mansfield, Napatree Point, Watch Hill, Rhode Island
- Fort H.G. Wright (Headquarters), Fisher's Island, Southold, New York
- Fort Michie, Great Gull Island, Southold, New York
- Fort Terry, Plum Island, Southold, New York
- Fort Tyler, Gardiner's Point, Gardiner's Island, East Hampton, New York

Continued improvements in armament and defensive systems, as well as changing international conditions, caused President Theodore Roosevelt to convene a new board in 1905 headed by Secretary of War William H. Taft to review the work of the

Endicott Board. The 1906 "Taft Board Report" describes the technology, defensive strategy and individual components represented by the forts of the Defenses of the Eastern Entrance to Long Island Sound from their establishment in 1897 to the World War I era. The "Taft Board Report" classified the Defenses of the Eastern Entrance to Long Island Sound as one of six "Defenses of First Importance" on the east coast and summarized the national significance of this system:

The importance of the fortifications at the entrance to Long Island Sound is due to the fact that they constitute the first and chief line of defense of New York city against naval attack from that direction; that they will prevent the occupation by a hostile fleet of Gardiner's Bay or other interior water as a naval base, and will also protect various manufacturing towns established along the sound, including New London, Bridgeport, New Haven and others.

The period leading up to World War I saw the maturity of the Defenses of the Eastern Entrance to Long Island Sound toward the ideal in technology, systems and components identified in the "Taft Board Report." An evolution in armament and protection of the defenses from new types of naval gunfire and aviation bombardment is associated with the World War I Era. The World War II Era saw the system expand with inclusion of Camp Hero at Montauk Point, New York, and with a wide network of fire control stations located beyond the confines of the forts. Following World War II the seacoast fortification became obsolete and all the forts of the Defenses of the Eastern Entrance to Long Island Sound were abandoned around 1948.

The Defenses of the Eastern Entrance to Long Island Sound, 1897 – 1948, were an important component of national defense strategy and were the primary defense of the northern approach to New York City and the ports of Long Island Sound during a period when attack of the continental United States by a foreign navy was considered a serious threat.

The Defenses of the Eastern Entrance to Long Island Sound illustrate the complete evolution of "The Modern Era" of American seacoast defense from the turn-of-the-century revolution in armament technology and fortification construction to the end of the period of seacoast fortifications in this country.

### **Property Types**

The property type **Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948** represents the historic context "Coast Defenses of the Eastern Entrance to Long Island Sound, 1897 – 1948." This property type includes the six forts which were historically part of this system: Fort Mansfield; Fort H.G. Wright; Fort Michie; Fort Terry; Fort Tyler; and Camp Hero.

The property type **"Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948"** contains a number of fortification components defined by the 1906 "Taft Board Report" which remained the basics of coast defense installations throughout the period of the historic context. These fortification components are:

**batteries; submarine mining; fire control; searchlights; and power plants.** The other component of a **Fort** property type is the **post buildings** associated with housing and providing services for the troops.

These components will represent the types and typical designs of each of the three eras of the national seacoast fortification system during this period: The Endicott and Taft Period; the World War I Era and the World War II Era. Additionally some fortification components will reflect an evolution as a result of being updated through this period.

These components have architectural significance as examples of the design and methods of construction of distinct types of structures representing a national standard usually documented by War Department plans.

### **Integrity Requirements**

The “**Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948**” property type should retain enough examples of each component to convey its scope of operations during the period and to illustrate the principles of coast defense during the period. The Fort should retain a setting that allows the relationships between the individual components of the fort to be perceived as well as the relationship between the fort, the waters being defended, and the other forts in the system.

All forts of the Defenses of the Eastern Entrance to Long Island Sound were abandoned around 1948 as were many other of the nation’s seacoast fortifications. At this time any remaining armament, observing instruments, searchlight projectors and other materiel were removed from the fortifications.

The fortifications are not readily adaptable to other uses and a certain amount of deterioration resulting from fifty years of abandonment is expected. Buildings of durable construction such as concrete or brick would be expected to be in better condition than buildings of more fragile construction such as cement plaster panels on a steel frame. A state of ruin of some less durable buildings is expected.

These seacoast forts are subject to shore erosion and loss or damage from this natural process is also expected.

The following requirements define the level of integrity necessary for the **Fort** property type to convey its significance in illustrating the historic context.

1. Because no forts of the Defenses of the Eastern Entrance to Long Island Sound retain their armament, observing instruments, searchlight projectors and other materiel, the presence of these items is not required. Only a few American forts of this period, which are now museums, have armament.



2. The fort should retain sufficient fortification components to convey a sense of its tactical mission and the scope of its operations and sufficient post buildings to convey a sense of the size and way of life of the garrison.

The batteries, which are of durable construction, are the most important components of a fortification. Batteries representing each fire command and field of fire should be intact. Mine command structures sufficient to indicate each area of intended deployment of submarine mines should be intact. A sufficient number of fire control structures and shelters for searchlights should be intact to represent the fire control system and the relationship of this system to the batteries and submarine mining operations. The power plants are the least important of the fortification components, they enhance the significance but are not critical.

3. Representatives of each component should retain a level of integrity to convey their architectural significance as a good example of their type. Batteries should retain all fabric with the exception of armament and apparatus. Some deterioration of the concrete and corrosion of steel is expected. Fire Control Structures should retain the instrument pedestal, observing slot and evidence of the type of data transmission. Shelters for Searchlights should retain the means of concealing the projector and the means of moving it to its operating position.
4. Some components are expected to be ruins as a result of abandonment and deterioration or of shore erosion. The ruin of a battery can provide information on its intended field of fire and its place in the larger system. The ruin of a fire control station illustrates the position-finding system and the field of fire of its respective battery. If requirement No. 3 above is met, a small number of fortification ruins are acceptable in the integrity threshold of the Fort property type.
5. The Post Buildings should indicate the cantonment area and convey a sense of the size of the garrison and the way of life at the fort.
6. Like the fortifications, the post buildings represent standard Army plans and construction practices typical of their eras. Representative post buildings should retain a level of integrity to convey their architectural significance as a good example of their type.
7. Integrity of setting is a critical factor for the Fort property type. All components of the fort were designed to complement one another in a defense system. Integrity of setting is critical in conveying the relationships between the components of the fort. Of special significance is the relationship between batteries, fire control structures, and searchlights.

## Evaluation

The historic resources on Plum Island associated with Fort Terry represent the property type **Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948.**

The Fort Terry resources are significant for illustrating the Defenses of the Eastern Entrance to Long Island Sound from 1897 to 1948, which is the entire historical period of this seacoast defense system. The Defenses of the Eastern Entrance to Long Island Sound were recognized in 1906 as one of six “Defenses of First Importance” on the east coast and in 1940 were still considered by the Army to protect “the most important strategic area in the continental United States.”

Fort Terry was an important component of the Eastern Defenses of Long Island Sound system with the principal role of defending the deep water channel into Gardiner’s Bay, Gardiner’s Bay itself, and Plum Gut, a deep water channel from Gardiner’s Bay into Long Island Sound.

The Fort Terry resources are particularly significant for illustrating the Endicott and Taft Period in the history of American seacoast fortifications. From 1898 to 1916 Fort Terry developed its greatest defensive capabilities. Forty-two of the sixty intact Fort Terry resources date from that era and together illustrate a complete seacoast defense system as set forth in the 1885 “Endicott Board Report” and in the 1906 “Taft Board Report.” These Fort Terry resources represent a full range of batteries, submarine mining facilities, fire control structures, shelters for searchlights and power houses. The intact setting conveys the historic relationships between these components.

The Fort Terry resources are architecturally significant for representing important types of fortification structures of the Endicott and Taft Period. These resources illustrate the design and construction methods of the following types of fortifications: batteries for five different caliber armament; mining casemate; combined torpedo storehouse and cable tanks; fire control observing station; fire control plotting room; fire control booth room; fire control switchboard room; fire control radio station; and shelter for searchlight. These resources also illustrate the building methods and technology of that period, especially the evolution of concrete and steel construction used in the batteries.

The twelve extant Fort Terry post buildings of the Endicott and Taft Period also represent different types, most of which also illustrate a national standard. Ten of these buildings are also significant for illustrating the construction methods of that period employing stone foundations, brick walls, and interior framing of heavy timbers and steel columns.

The Fort Terry resources are also significant for illustrating the evolution in seacoast fortification during the World War I Era with construction of bombproof shelters and anti-aircraft batteries in response to the new threat of aviation bombardment and the new trajectories of naval gunfire. The Fort Terry resources also recall the Harbor Defenses of Long Island Sound during the World War II era

with nine fortifications of that period. The diminished role of Fort Terry in the World War II defense system illustrates the evolution of that era when more powerful guns pushed the line of defense farther toward the sea boundary.

An evaluation of the integrity requirements for the **Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948** property type follows these steps.

1. Integrity of each fortification component (Batteries, Submarine Mines, Fire Control, Searchlights, Power Plants).
  2. Integrity of the fortifications as a whole.
  3. Integrity of the setting of each geographic area of fortifications
  4. Integrity of the post building component
  5. Integrity of the setting of each geographic area of post buildings
  6. Integrity of the Fort property type
- 
1. Integrity of each fortification component

#### Integrity of the Batteries

The batteries retain a high level of integrity. Of the sixteen batteries identified in the Historic Overview, one is lost and one is a ruin. The remaining fourteen intact batteries represent each fire command and each type of armament that existed at Fort Terry. All armament and materiel was removed by 1948.

The 3" gun Battery Peter Hagner (1906), which stood on the west shore of Pine Point and faced Plum Gut, was undermined by shore erosion. A ca. 1954 photograph shows Battery Hagner broken up on the beach. Continued shore erosion has left the ruins of Battery Hagner visible only at low tide in Plum Gut approximately 100 yards from the shore. This battery is lost. The location of fire control stations, however, remain to indicate the intended field of fire of this battery.

The 3" gun Battery Henry Campbell (1906) was undermined by erosion and is a ruin on the beach. It still conveys its intended field of fire and its place in the larger system. Three identical 3" gun batteries are intact on Plum Island to represent the type.

The nine intact Endicott and Taft Period batteries are in fair condition due to being maintained by PIADC from 1954 into the 1970s and 1980s. Gun platforms are intact and retain such features as the gun pits, base rings, anchor bolts for the carriages; maneuvering rings, lights, and telephone recesses. The rooms within the magazine structures are intact including powder magazines, powder passages, shell rooms, truck corridors, plotting rooms, power rooms, and storerooms. Other intact components of the magazine structures include: steel plate outer doors; steel grate inner doors; steel window shutters; shell trolley tracks; and ammunition hoists. These nine batteries represent six different types and each retains sufficient integrity to be a good example of its type.

The World War II Era Battery Construction No. 217 is in good condition as are the gun blocks of the 155mm Gun Battery and the Anti-Motor Torpedo Boat No. 911 battery.

#### Integrity of the Submarine Mine Facilities

Submarine mine activity ceased at Fort Terry following World War I. Either before or during the renovations of 1940 – 1941 a number of mine command structures were demolished. These include the facilities at Plum Gut Harbor (Torpedo Loading Room, Torpedo Magazine and Service Magazine Room) and the facilities at South Wharf (Mining Casemate and Torpedo Loading Room) and the Mining Cable Hut. Eventually South Wharf became a ruin and disappeared and Torpedo Wharf at Plum Gut Harbor was replaced.

Remaining intact facilities convey the locations of the intended mine fields, the importance placed on mining operations in Gardiner's Bay, and a sense of the scope of the submarine mining operations which could be deployed from Fort Terry. The 1898 Mining Casemate documents the original intent to deploy mines in Long Island Sound. The Bombproof Mining Casemate documents the mining operations in Gardiner's Bay. The 13,000 square foot Combined Torpedo Storehouse and Cable Tanks at South Wharf indicates the substantial capabilities of the mine command at Fort Terry and the shifted priority to Gardiner's Bay.

The 1898 Mining Casemate is entirely intact and is an excellent example of the early standard type of mining casemate. The interiors of the Bombproof Mining Casemate and the Combined Torpedo Storehouse and Cable Tanks are altered.

The three fire control structures associated with the mine command (Double Mine Primary Station M' 3 – M' 3, Mine Secondary Station, M"3 and Base End Station M""3) also convey the location of the submarine mining operations in Gardiner's Bay and Plum Gut.

#### Integrity of the Fire Control Structures

Thirty-one fire control structures dating from 1898 to 1944 remain on Plum Island. The only documented stations to be lost are: nine 1902 observing stations of wood construction and two stations associated with Battery Hagner which were also lost to shore erosion. One 1901 station and two 1914 stations were replaced on the same site with new stations in 1944.

Of the thirteen original 1900 to 1902 fire control stations, two remain intact, although one is altered. Two stations were replaced in 1914. The nine "temporary wooden structures" of this period are lost.

The fire control system at Fort Terry was modernized from 1906 to 1914 to incorporate the technology and organization recommended by the 1906 "Taft Board Report." This system, with the addition of three stations in 1920 – 1923,



remained intact until the World War II Era. This is the system associated with the full range of Fort Terry's fire command and mine command during the period of its greatest defense capabilities. Of the 28 fire control structures of this period (1906 – 1923): 20 remain intact; three remain as ruins; three were rebuilt in 1944; and two stations associated with Battery Hagner are lost to shore erosion. The 1903 to 1923 fire control system retains a high level of integrity with 20 of the 28 structures surviving and the sites of six others documented either by ruins or by replacement fire control structures.

Of the ten fire control structures constructed or reconstructed from 1943 to 1944 and intended for service during the World War II era: eight remain intact; and two are ruins. The World War II era fire control system also retains a high level of integrity.

The seventeen intact observing stations all retain the instrument pedestals and observing slots; the four observing stations which are now ruins retain the instrument pedestals. Intact fire control structures represent good examples of a wide range of types and periods. These stations retain information on the design, construction materials and methods, type of data transmission, and their function in the fire control system. Intact fire control structures represent the following types: observing stations; open observing stations; plotting rooms; a booth room; telephone and telautograph booths; a switchboard room; a radio station and pedestal-type battery commander's stations. These structures document the typical construction methods of the following periods: cement plaster on a wood frame, 1906; cement plaster panels on a steel frame, 1914; cement plaster on hollow tile, 1920; concrete and a steel frame, 1923; and reinforced concrete, 1944.

#### Integrity of the Searchlights

Five of the six documented shelters for searchlights remain on Plum Island. Shelter for Searchlight No. 15, near the lighthouse, was lost to shore erosion in 1997. The projectors are missing from the five intact shelters.

The five shelters for searchlights meet the integrity criteria. Although the roofs of two shelters have fallen, all five indicate the type of shelter. The operating position of the searchlights is documented by the intact railroad tracks extending from four shelters and by the "disappearing apparatus" at Shelter for Searchlight No. 7.

Four of the five intact shelters, all except No. 7, were active through the World War II period and have been renovated. They document three periods of construction: cement plaster panels on a steel frame and bowstring roof, 1912; brick replacement walls, 1920s; and reinforced concrete slab roofs, 1942.



### Integrity of the Power Plants

Surviving power plants document the practice recommended in the "Taft Report" of separate sources of power for the searchlights. The South Hill Power Plant, although a ruin, contributes to the setting of Shelters for Searchlights Nos. 13 and 14 on South Hill. The power plant in Battery Stoneman is intact and is associated with the searchlights at East Point. The Pine Point Power Plant, which provided power for Searchlight No. 15, is lost.

The integrity criteria do not require intact power plants. Therefore the existence of these power plants enhance the setting of the more important surviving structures.

## 2. Integrity of the fortifications as a whole.

Overall the fortifications retain a high level of integrity. The large number of intact structures clearly convey Fort Terry's principle tactical role in the Defenses of the Eastern Entrance to Long Island Sound of defending Gardiner's Bay. They also convey the diminished role of Fort Terry during the World War II era.

The intact fortifications represent the entire scope of tactical operations at Fort Terry from 1897 to 1948 and the interrelationship between the different components. They convey the field of fire of the batteries, the areas of the intended mine fields and the scope of submarine mining capabilities; the organization of the battle command, fire commands, mine command and battery commands; the systems of position finding for each battery and mine command; and the relationship of the searchlights to the fire control system.

Intact structures represent good examples of a wide range of fortification structures dating from 1898 to 1944. Among the most significant of these structures are those representing standard types from the Endicott and Taft Period including: nine batteries representing standard types for five different types of armament; the 1898 Mining Casemate; and the wide variety of fire control structures.

## 3. Integrity of the settings of the fortifications

East Point has the greatest concentration of fortifications with nine batteries; sixteen fire control structures; and three shelters for searchlights. East Point retains a high level of integrity of setting. These fortifications are the only structures on East Point. The roadways and the earthworks associated with construction of an access to the batteries are evident. The relationships between batteries, fire control structures and searchlights is evident. The intended field of fire from the batteries is evident as is the relationship of East Point with the

entrance to Gardiner's Bay and other fortifications in the Defenses of the Eastern Entrance to Long Island Sound: Fort Tyler, Fort Mitchie and Fort H.G. Wright. The integrity of setting of the East Point fortifications is diminished only by the extensive overgrowth which does diminish the visual relationships.

Pine Point is the other principle area of fortifications and it also has an intact setting. The fortifications are the only structures on Pine Point. The lack of overgrowth on this sandy point make the visual relationships between elements even more apparent.

Most other fortification structures are at remote areas of the island where there are no other buildings. They all retain integrity of setting and retain the earthworks concealment. For these fortifications, especially for the observing stations, the setting is compromised only by extensive overgrowth which obscures the intended field of view.

#### 4. Integrity of the post building component

The Fort Terry post buildings of the Endicott and Taft Period, 1898 – 1916, were in three general groupings: barracks and N.C.O. quarters at the 1898 "old parade ground;" barracks and service buildings at the east end of the parade ground; and officer's row on the north side of the parade ground.

The frame buildings at the "old parade ground" were demolished by 1952 and the brick N.C.O. quarters were demolished in 1961 - 1963, with the exception of Building No. 47 Fireman's Quarters which remains intact. The frame buildings of Officer's Row were demolished by 1952 and the brick officer's quarters were demolished in 1961 - 1963.

By contrast, the complex of post buildings at the east end of the parade ground is nearly entirely intact. Ten of the eleven brick buildings constructed in this area between 1900 and 1912 remain. These include the two brick barracks, the largest barracks ever constructed at Fort Terry, as well as a nearly complete range of post service building types including a hospital, guard house, post exchange, commissary store house, quarter master's workshop, quarter master's storehouse, bakery, and tailor shop. The only Endicott and Taft Period building of this complex to be lost is the 1906 Gymnasium Building which was destroyed by fire in 1921. These buildings were used by PIADC until the 1990s and therefore remain in good condition. Some remain in nearly original condition while others have been altered for PIADC use. The level of integrity and the condition of this group of buildings is better than expected for a property type that was abandoned by the Army in 1948.

The integrity of the entire system of post buildings at Fort Terry is greatly diminished by the loss of Officer's Row and the loss of all but one building at the 1898 parade ground. Nevertheless, the complex of ten Endicott and Taft Period post buildings at the east end of the parade ground is a remarkable intact unit. These buildings convey the location of the cantonment and the size of the Fort

Terry garrison. The substantial stone and brick buildings also illustrate the importance and permanence of Fort Terry as a component of a defense system of "First Importance" during the Endicott and Taft Period. The barracks, the parade ground, and the other service buildings also recall the structure and way of life at Fort Terry, at least for the enlisted men.

During the World War I Era temporary post buildings were constructed at the east and west ends of the parade ground. These were removed before the World War II era when temporary cantonment buildings were constructed at the west end of the parade ground and at the beginning of East Point. All the World War II Era temporary buildings were demolished by 1949, with the exception of the chapel and three power houses. These World War I Era and World War II Era temporary buildings were apparently associated with training facilities for Army recruits and therefore were not part of the principal significance of Fort Terry. The loss of these building does not diminish the integrity of the Fort Terry resources in their ability to convey the significance of the historic context.

#### 5. Integrity of the settings of the post buildings

The immediate setting of the complex of 12 post buildings at the east end of the parade ground retains a high level of integrity. The ten brick post buildings of the Endicott and Taft Period form a cohesive group with each building complementing the setting of its neighbors. The setting is enhanced by the parade ground which extends to the west and south along the shore of Gardiner's Bay.

The large concrete-block additions to Buildings Nos. 38, 60 and 63, which date from the initial 1954 – 1956 renovations by PIADC, somewhat diminish the integrity of the setting. These alterations and other minor changes of the PIADC era are clearly secondary features. The setting retains the character of the Fort Terry cantonment of the Endicott and Taft Period.

The larger setting of the entire parade ground is seriously diminished by the loss of Officer's Row along the north side of the parade ground.

Building No. 47, Fireman's Quarters, is the only extant structure at the site of the 1898 parade ground. The 1898 parade ground remains as a slightly-overgrown meadow bordered by abandoned roadways and rows of mature trees. Although the integrity of setting is greatly diminished, these two resources, recall the site of the first Fort Terry cantonment.

## 6. Integrity of the Fort Property Type

The Fort Terry resources in an intact setting retain the level of integrity required of the **"Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948"** property type.

Among the Fort Terry resources are thirteen batteries, three submarine mining facilities, 20 fire control structures and five shelters for searchlights which together convey the scope of operations at Fort Terry and illustrate the principles of coast defense during the period of the historic context.

The 18 extant post buildings indicate the cantonment areas of Fort Terry and convey a sense of the size of the garrison and the way of life at the fort. This is particularly true of the complex of ten Endicott and Taft Period post buildings at the east end of the parade ground.

Among the 60 Fort Terry resources are representatives of each type of component which retain a high level of integrity and are architecturally significant as good examples of their type and period.

Overall the setting of the Fort Terry resources retains a high level of integrity which allows the relationships between the individual components of the fort to be perceived as well as the relationship between the fort, the waters being defended, and the other forts in the system. Most of the 34 PIADC era structures are grouped in areas of Plum Island where they have little impact on the setting of the Fort Terry resources. Nine buildings are at the northwest quadrant in the vicinity of Building No. 101 and ten buildings are at Plum Island Harbor where there are no Fort Terry resources. Most of the other 15 PIADC buildings are in wooded areas where they have no visual impact on the setting of the Fort Terry buildings and structures.

## **Registration Considerations**

The Fort Terry resources and their intact setting constituting the **"Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948"** property type possess the characteristics of a historic district. Listing these resources on the State and National Registers may take the form of a historic district nomination. The boundaries of a Fort Terry Historic District could comprise all of the land historically associated with Fort Terry, all of Plum Island except the lighthouse reservation. Another option would be to draw the boundaries to exclude the concentrations of PIADC era buildings at Plum Island Harbor and in the vicinity of Building No. 101. This boundary would exclude only two Fort Terry sites, the ruins of the Mine Secondary Station M" 3 (No. 19) and the ruins of the Crematory (No. 49), from the historic district.

## LIST OF INVENTORIED RESOURCES

### RESOURCES ASSOCIATED WITH THE PLUM ISLAND LIGHT STATION

1. Plum Island Lighthouse
2. Plum Island Light Station Oil House
3. Plum Island Light Station Storage Shed
4. Plum Island Light Station Fog Bell

### RESOURCES ASSOCIATED WITH FORT TERRY

#### Batteries

##### Endicott and Taft Period Batteries

1. Battery Steele
2. Battery Kelly
3. Battery Stoneman  
Telephone and telautograph booths (Stoneman)
4. Battery Bradford  
B', BC & P (Bradford)
5. Battery Justin Dimick  
Fire Control Structure No. 1 – R  
P (Dimick)
6. Battery Robert Floyd  
CRF, BC & P (Floyd)
7. Battery Henry Campbell  
BC (Campbell)
8. Battery James Dalliba  
BC (Dalliba)
9. Battery John Greble  
BC (Greble)
10. Battery Bogardus Eldridge

##### World War II Era Batteries

11. Battery of 155 MM Guns
12. Anti Motor Torpedo Boat No. 911
13. Battery Construction No. 217  
Fire Control Structure No. 1 – V



## **Submarine Mining**

### Endicott and Taft Period Submarine Mining Facilities

14. Mining Casemate
15. Combined Torpedo Storehouse and Cable Tanks

### World War I Era Submarine Mining Facilities

16. Bombproof Mining Casemate

## **Fire Control**

### Endicott and Taft Period Fire Control Structures

17. Combined C2 (Terry) F"5 (Stoneman)  
& Meteorological Station
18. Double Mine Primary Station M' 3 – M' 3
19. Mine Secondary Station, M"3
20. Base End Station M""3
21. Base End Station F""5
22. Base End Station F""4
23. F'4, BC & P (Steele)
24. Fire Control Structure No. 1 - O  
P (Stoneman)
25. CRF & P (Kelly)
26. 9' CRF (Eldridge)
27. Signal Corps Switchboard Room  
Bombproof Shelter

### World War I Era Fire Control Structures

28. Radio Station
29. 9' CRF (Campbell)
30. 9' CRF (Greble)

### World War II Era Fire Control Structures

31. SCR – 296A Site
32. Fire Control Structure No. 1 – G
33. Fire Control Structure No. 1 – GG
34. Fire Control Structure No. 1 – P
35. Fire Control Structure No. 1 – S
36. Observing Station (Dalliba)

## **Searchlights**

### Endicott and Taft Period Searchlights

37. Shelter for Searchlight No. 7
38. Shelter for Searchlight No. 11
39. Shelter for Searchlight No. 12
40. Shelter for Searchlight No. 13
41. Shelter for Searchlight No. 14

## **Power Plants**

### Endicott and Taft Period Power Plants

42. South Hill Power Plant,

## **Post Buildings**

### Endicott and Taft Period Post Buildings

43. Building No.	13	Tailor Shop
44. Building No.	14	Hospital
45. Building No.	37	Commissary Storehouse
46. Building No.	38	Quarter Master's Workshop
47. Building No.	44	Bakery
48. Building No.	47	Fireman's Quarters
49. Building No.	48	Crematory
50. Building No.	49	Post Exchange
51. Building No.	54	Barracks
52. Building No.	55	Barracks
53. Building No.	60	Quarter Master's Storehouse
54. Building No.	61	Jerome Reservoir
55. Building No.	63	Guard House

### World War I Era Post Buildings

56. Building No. 115 Fire Pump House

### World War II Era Post Buildings

57. Building No. T 226	Power Plant
58. Building No. T 227	Power Plant
59. Building No. T 228	Power Plant
60. Building No. T 232	Chapel

## **RECOMMENDATIONS**

### **INTRODUCTION**

#### **The Current State of the Historic Buildings on Plum Island**

This Intensive Level Survey has identified 64 buildings, structures and objects which appear to meet the criteria for listing on the National Register of Historic Places. Four of these historic properties are associated with the Plum Island Light Station. The remainder are grouped under the property type "Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948.

Some Fort Terry fortification structures, such as the fire control structures and shelters for searchlights, have been abandoned since Fort Terry was deactivated in 1948. While some remain in fair condition, about a quarter of these are in a state of ruin.

Many other of the Fort Terry buildings and structures were used and maintained by PIADC from 1954 into the 1980s and 1990s. Many of the Fort Terry batteries had been used by PIADC as animal holding and breeding facilities from 1954 until this use gradually ceased during the 1980s. The Combined Torpedo Storehouse and Cable Tanks was used as a containment laboratory from 1954 until 1995. PIADC also initially used the Fort Terry post buildings for offices, trade shops, cafeteria, library, small animal breeding facilities and other functions from 1954 into the 1980s and 1990s when these uses were gradually transferred to new buildings. The most significant change occurred when all administrative offices were consolidated in the new Building No. 100 in 1994 resulting in the abandonment of all but three of the twelve Fort Terry brick post buildings of the period 1900 to 1918.

The Plum Island Lighthouse has been vacant since 1978 when the light was automated.

Today, 61 of the 64 historic properties are abandoned. While many of the most important buildings and structures are in good condition due to their recent use by PIADC there is no plan for continued maintenance.

#### **The Conflict Between the PIADC Mission and Historic Preservation Goals**

The scientific mission of the Plum Island Animal Disease Center is to conduct research and diagnostic services on animal diseases that are foreign to the United States. Allocation of funding by Congress is to perform the activities within that mission. Undertaking even minor maintenance on any abandoned historic structures would divert funds away from the mission, thereby diminishing the amount and quality of the science conducted at PIADC. Any maintenance or preservation work recommended here would require separate dedicated funds to carry out.

The research and diagnostics at PIADC is conducted in biocontainment laboratories. The act establishing the Plum Island facility (Public Law 80-496, dated April 24, 1948) required the research laboratory be located on an island entirely under federal control and separated from the mainland by deep, navigable waters. Plum Island itself is a component of the biological safety system. PIADC has a safety policy which restricts access of the general public to Plum Island.

The PIADC mission, the operational budget of monies devoted to research and diagnostics, and the safety policy of restricted access create a conflict with the goal of utilizing and/or maintaining the historic properties in accordance with the National Historic Preservation Act.

### **DEVELOPING A PLUM ISLAND HISTORIC PRESERVATION PLAN**

These recommendations are intended to introduce the issues concerning USDA responsibilities under the National Historic Preservation Act. USDA should consult with the New York State Historic Preservation Officer and the Advisory Council on Historic Preservation to develop a plan to carry out these responsibilities.

Section 106 of the National Historic Preservation Act requires Advisory Council review of a USDA undertaking that would effect a historic property and Section 110 requires stewardship by USDA of the historic properties on Plum Island. It is recommended that USDA fulfill their responsibilities by establishing a Plum Island Historic Preservation Plan in coordination with the State Historic Preservation Officer. This plan and the proposed treatment of the historic buildings which it prescribed would be submitted to the Advisory Council for review and comment.

#### **Section 106.**

The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State...shall, prior to the approval of the expenditure of any Federal funds on the undertaking...take into account the effect of the undertaking on any district, site, building, structure or object that is included in or eligible for the inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation ... a reasonable opportunity to comment with regard to such undertaking.

Section 106 of the National Historic Preservation Act requires PIADC to assess the effect an undertaking will have on a historic property or a group of historic properties. If the effect is adverse, PIADC must notify the Council and consult with the State Historic Preservation Officer to seek ways to avoid or reduce the effect on the historic properties. The consultation may result in a Memorandum of Agreement between the parties which would be submitted to the Council for comment. If no agreement were reached PIADC would submit the proposed undertaking to the Council for comment.

It is important to note that Section 106 Regulations (36CFR Part 800) define "neglect" of a historic property as an undertaking subject to Council comment. Section 800.9 (b): "An undertaking is considered to have an adverse effect when the

effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Adverse effects on historic properties include, but are not limited to: ... (4) Neglect of a property resulting in its deterioration or destruction;...”

#### **Section 110.**

(a) (1) The heads of all Federal agencies shall assume responsibility for the preservation of historic properties which are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for the purposes of carrying out agency responsibilities, each Federal agency shall use, to the maximum extent feasible historic properties available to the agency. Each agency shall undertake, consistent with the preservation of such properties and the mission of the agency and the professional standards established pursuant to section 101 (g), any preservation, as may be necessary to carry out this section.

(2) Each Federal agency shall establish...a preservation program for the identification, evaluation, and nomination to the National Register of Historic Places, and protection of historic properties. Such program shall ensure –

(A) that historic properties under the jurisdiction or control of the agency, are identified, evaluated and nominated to the National Register;

(B) that such properties under the jurisdiction or control of the agency as are listed in or may be eligible for the National Register are managed and maintained in a way that considers the preservation of their historic, archeological, architectural and cultural values in compliance with Section 106. ..

Section 110 of the National Historic Preservation Act requires PIADC to take responsibility for identifying the historic properties on Plum Island and managing and maintaining them in a manner that considers their historic value.

One way to fulfill these responsibilities would be to establish a Plum Island Historic Preservation Plan in consultation with the Advisory Council on Historic Preservation and the New York State Historic Preservation Officer. This plan could include a process to identify and evaluate historic properties and to manage and maintain historic properties. The plan might also include provisions to preserve the historic records at PIADC. The following sections discuss the process of developing such a plan and present what might be some of its components.

### **Identify and Evaluate Historic Properties**

#### Historic Properties Associated with Fort Terry and the Plum Island Light Station

In 1997 PIADC commissioned this Intensive Level Survey to identify and evaluate all buildings and structures on Plum Island. The List of Inventoried Resources identifies the four significant resources associated with the Plum Island Light Station and the 60 significant resources grouped under the property type “Defenses of the Eastern Entrance to Long Island Sound Fort, 1897 – 1948.”



The next step in this process will be a determination of National Register eligibility by the New York State Historic Preservation Officer for the properties identified in this survey. The Plum Island Lighthouse was determined to be eligible for listing on the National Register of Historic Places in 1973. It is recommended that PIADC pursue nomination of eligible properties to the National Register of Historic Places.

Before any actions are taken that might have an adverse effect on a historic Fort Terry building or fortification, the level of significance of the Fort Terry properties should be determined by comparing them with those of other forts. The progression in this comparison would be: with other fortifications in the Defenses of the Eastern Entrance to Long Island Sound; with other fortifications in New York State; and with other fortifications on the East Coast.

#### Plum Island Animal Disease Center Buildings

This intensive survey was designed to include inventory forms on the 38 buildings constructed by PIADC from 1954 to the present. The buildings are less than 50 years old, do not appear to meet the criteria for exceptional importance and are not considered eligible for listing on the National Register.

#### Summary of Recommendations to Identify and Evaluate Historic Properties

- Determination of eligibility to the National Register by the SHPO based on this intensive survey.
- Nomination of eligible properties to the National Register
- Evaluation of level of significance of Fort Terry historic properties prior to assessing the effect of an undertaking that could have an adverse effect.

#### **Manage and Maintain Historic Properties**

A management plan for the historic properties should be developed in coordination with the New York State Historic Preservation Officer and the Advisory Council. A critical part of developing this program will be balancing the conflicts between the PIADC mission, the policy of restricted access, budgetary considerations and the historic preservation goals of maintaining the historic properties.

Three of the twelve Fort Terry post buildings are threatened by badly leaking roofs. These leaks should be repaired immediately in order to prevent serious structural damage that could place them beyond the point of being stabilized by routine maintenance. Immediate repair to these three roofs would alleviate the sense of emergency and would allow more time for developing a management program.

Another maintenance item that may inform the planning process would be a trial mothballing of one of the twelve brick post buildings in 1998. This would help PIADC understand the process and costs of mothballing this group of buildings.

### Considerations in Developing a Management Program

PIADC should consider the “management factors” outlined in the Section 110 Guidelines. The following observations may also inform the planning process.

It might be helpful to break the historic properties into groups when assessing them and considering alternate treatments. A possible grouping may be:

- Properties associated with the Plum Island Light Station
- Twelve Brick Post Buildings
- Batteries
- Other Fortifications
- Combined Torpedo and Cable Storehouse (Building No. 257)

Alternate treatments may include: adaptive use; mothballing; neglect (doing nothing); and demolition. Factors to consider in assessing the alternate treatments may include: considering the relative condition, integrity, and level of significance of individual properties and groups of properties; and comparing the costs of each treatment over different time periods.

The plan may consider whether there is a way to allow limited public access to the historic properties without jeopardizing the safety requirements.

The plan may establish a procedure for review of PIADC undertakings under Section 106. The plan may include an agreement for a streamlined review process for alterations or demolition of PIADC era buildings (1954 – present). A Section 106 agreement that would allow demolition of PIADC era additions and alterations to the historic properties might also be considered. Removal of these additions could reduce the cost of maintenance.

### Study of Shore Erosion as Part of a Management Program

Erosion of the Plum Island shoreline has caused the loss of some historic structures and threatens others today. The Section 110 Guidelines require that “adverse effects resulting from natural forces” need to be considered by PIADC and actions to avoid or mitigate the effect be developed and reviewed under Section 106.

Among the Fort Terry fortifications to be lost is Battery Peter Hagner which was undermined by erosion and is now a ruin in Plum Gut. Fire command structures associated with Battery Hagner have also been lost to erosion. Battery Henry Campbell at the tip of East Point has been undermined and is a ruin on the beach. The undermined Shelter for Searchlight No. 15 near the Plum Island Lighthouse was a safety hazard and was bulldozed off the bluff in 1997.

Battery Dalliba on East Point is threatened by shore erosion which has undermined half of gun block number two. The frontal wall of Battery Eldridge has been exposed by erosion of the shoreline at Pine Point.

The greatest threat to the Plum Island Lighthouse is from erosion of the bluff on which it stands. The base of the earthen plinth of the lighthouse is only 45' from the edge of the bluff.

The three biocontainment buildings are all located on the shoreline: Building No. 101 Laboratory; Building No. 102 Decontamination Building; and Fort Terry Combined Torpedo Storehouse and Cable Tanks (PIADC Building No. 257 Laboratory).

The combined concern for the protection of the biocontainment buildings and the preservation of the historic structures, especially the lighthouse, justify a study of the shoreline erosion of all of Plum Island. Such a study could be commissioned from the U.S. Army Corps of Engineers.

#### Summary of Recommendations to Manage and Maintain Historic Properties

- Immediately repair the leaking roofs of Buildings Nos. 37, 44 and 55.
- Mothball one of the 12 brick post buildings of the period 1900 – 1918 on a trial basis in 1998.
- Commission a study of shore erosion of Plum Island by the Army Corps of Engineers in 1998.
- In coordination with the New York State Historic Preservation Officer, begin immediately to develop a Plum Island Historic Preservation Plan to fulfill PIADC responsibilities under the National Historic Preservation Act.

#### **Preserve Historic Records at PIADC**

PIADC is fortunate to have a collection of historic records documenting both the Fort Terry buildings and the PIADC buildings. Some Fort Terry records apparently remained on Plum Island when the Department of Agriculture took over in 1954. These records include photographs and Fort Terry documents in the Library and architectural plans in the Engineering Office.

Some measures could be taken to ensure the long term preservation of these records. The photographs and other material in the library should be cataloged, organized and stored together as a historical collection.

The early maps and architectural plans in the Engineering Office should be cataloged, organized and stored together. These include architectural plans from the 1952 – 1954 period when the initial research facility was being planned by the U.S. Army Chemical Corps and the Dept. of Agriculture. Plans and maps that are presently rolled or on steel vertical hangers could be better preserved in flat files.

PIADC should purchase archival storage materials for these records and some additional flat files for the engineering department.

## **PROPERTIES ASSOCIATED WITH THE PLUM ISLAND LIGHT STATION**

### **PRESERVATION GOALS:**

- Stabilize the bluff at the lighthouse;
- Preserve the lighthouse either by adaptive use or by mothballing; in either case carry out required exterior stabilization work;
- Provide a stable housing for the fog bell.

### **Plum Island Lighthouse**

The greatest threat to the Plum Island Lighthouse is shore erosion. At its closest point, the edge of the bluff is approximately 60' west of the lighthouse. The base of the earthen plinth on which the lighthouse stands is 45' west of the bluff. The nearly-vertical crest of the bluff would need to be cut back during any stabilization work, further reducing any "margin of safety." The recommendation above for a study of shore erosion addresses this concern for the preservation of the lighthouse on its original site. The shore erosion study should be conducted before the alternative of moving the Plum Island Lighthouse is considered. Moving the lighthouse would appear to be more expensive than stabilizing the bluff.

The Plum Island Lighthouse was manned and maintained by the U.S. Coast Guard until it was deactivated in 1978. The lighthouse has not been used since 1978. The property was transferred to PIADC in 1990. In 1984 PIADC accomplished two important maintenance tasks when they repaired the asphalt shingle roof and fitted all windows with new exterior storm units. With some additional exterior stabilization the Plum Island Lighthouse could be maintained in good condition for an indefinite period.

Documentation in the form of a historic structure report is recommended. This report would serve as a guide for stabilization and maintenance of the lighthouse; it would ensure that all steps would be coordinated and progress toward a single goal. Documenting the original appearance and material of the Plum Island Lighthouse should be relatively easy with the resources of the National Archives and the examples of the similar 1867 Block Island North Lighthouse, the 1868 Norwalk Island Lighthouse, the 1868 Great Captain Island Lighthouse, the 1868 Morgan Point Lighthouse and the 1868 Old Field Point Lighthouse. The historic structure report would include a complete investigation and analysis of existing conditions and detailed recommendations for stabilization as well as considerations for mothballing or adaptive use of the lighthouse.

The documentation phase would also include cataloging and storing the architectural fragments, including balusters, a handrail section and a newel cap which are presently scattered about the interior.

Following is a draft list of stabilization requirements of the Plum Island Lighthouse based on a brief field survey. It is provided here to inform the planning process by contributing to an assessment of the condition of the lighthouse and the costs associated with maintaining it.

#### Site.

Vegetation around the lighthouse should be mowed and especially cleared from the walls. Once mowed, the grade should be checked all around the lighthouse for a positive slope away from the foundation.

The grade on the west side at the intersection with the workroom wing should be checked and the concrete cover in this area investigated.

Extensions should be attached to both leaders to discharge on the slope away from the lighthouse.

#### Exterior Ironwork.

There is significant corrosion of the cast iron tower, lantern and roof of the entry pavilion. If corrected now and controlled through continued maintenance, all original material can be retained. If postponed, original material may be lost and the cost of repairs will be significantly higher.

All ironwork should be carefully prepared, primed and painted. All bolts should be checked and any questionable fasteners replaced.

The lantern balcony railing should be removed and the bolt holes in the deck filled in. This will correct a problem leading to continued corrosion of the balcony. A new railing could be a replica of the original, properly installed.

All lantern glass should be removed and the cast iron frame thoroughly restored, building up material where necessary. New lantern glass should then be installed.

The missing section of cornice of the front entry pavilion should be replicated and replaced.

#### Exterior Masonry

The 1/8" to 1/4" cracks in the masonry walls do not appear to present a significant structural problem. A historic structure report might include an inspection by a qualified structural engineer. The cracks should be accurately mapped on elevation drawings or large-scale photographs to allow monitoring. The cracks would then be repointed. Isolated areas need repointing, especially the chimney.

#### Exterior Woodwork

The storm panels will protect the original window sash for a period of years. Repairing, renewing the glazing and painting the windows sash could be postponed if the lighthouse were mothballed. Some maintenance painting of other exterior woodwork would be required.



### **Oil House and Storage Shed**

The ca. 1900 Oil House and the ca. 1920 –1926 Storage Shed are significant accessory buildings associated with the lighthouse and complement its setting. These buildings are in generally good condition and can be stabilized with routine maintenance. The Oil House will in the near future require a new roof and repairs to the front door. The Storage Shed requires a new asphalt shingle roof, painting the exterior woodwork replacing missing window lights. The vines around the buildings should be cut down and a grass border maintained around the buildings.

### **Fog Bell**

The ca. 1871 Plum Island Light Station Fog Bell is presently installed on a framework on the Plum Island Harbor breakwater. The fog bell is a rare survivor and is as valuable as the fourth order lens associated with this lighthouse.

The fog bell is threatened by the seriously deteriorated state of the timber framework which carries it. This structure should be rebuilt.

### **Fourth Order Lens**

The fourth order lens, along with its pedestal and clockworks, was removed from the lighthouse in 1994 and are presently on display at the East End Seaport and Marine Foundation museum in Greenport, New York.

PIADC retains ownership of these artifacts and should continue to exercise that responsibility. If not provided for at present, a periodic review and extension of the loan should be instituted as well as a provision to allow the apparatus to be returned to the Plum Island Lighthouse in the future.

## FORT TERRY POST BUILDINGS, 1900 - 1918

### PRESERVATION GOALS:

- Immediate repair of the leaking roofs of Buildings Nos. 37, 44 and 55.
- Preserve the buildings either by adaptive use or by mothballing; in either case carry out required exterior stabilization work;
- Maintain the parade ground and lawn around the perimeter of the buildings.

The twelve Fort Terry buildings associated with housing and services for the Fort Terry personnel have a high level of significance. These brick buildings were constructed between 1900 and 1918 and all are situated in the vicinity of the Parade Ground. With their similarities in materials and design these buildings form a cohesive unit which recalls the cantonment of an Endicott Period fortification.

Special attention should be given to the significance of this grouping of brick post buildings at the parade ground. Each of these buildings contributes to the larger setting of an intact military post. These buildings may be one of the few intact groupings of post buildings of this period to survive. Individual buildings may also be rare examples of the standard quartermaster plans of this period. It is strongly recommended that before an undertaking having an adverse impact is considered that these buildings be compared with other fortifications of this period in New York State and on the East Coast to determine how rare the Fort Terry examples are individually and as a group.

All twelve buildings were used by PIADC beginning in 1954. Some were renovated by the U.S. Army Chemical Corps in 1953-1954 and others were renovated or enlarged by the Dept. of Agriculture beginning in 1954. Between 1990 and 1996 nine of these buildings were abandoned by PIADC when the operations housed in them were relocated to the new Building No. 100 and to the Technical Warehouse as part of the consolidation plan. Three of these buildings continue to be used by PIADC (Building No. 13, Fire Station; Building No. 38, Motor Pool; and Building No. 47, Housing) although under the consolidation effort these operations may also be relocated to be closer to the Building No. 100 complex.

These twelve buildings were used and maintained by PIADC into the 1990s and are in good condition. With some general repair these twelve buildings could be maintained in good condition for an indefinite period. Three buildings require emergency roof repairs to prevent deterioration that would threaten their structural integrity.

Part of the planning and assessment involved in preparing a Preservation Plan for this group of important Fort Terry buildings will be an assessment of the costs of maintaining them and possibly mothballing them. The following observations are intended to inform that process by pointing out required maintenance. Buildings Nos. 13, 38, 47, and 63 are in a good state of repair.

## **Building No. 14, Hospital**

### Gutters

The galvanized eaves of the annex show extensive rust stains. Investigation of the built-in gutter and correcting any leaks would prevent more serious deterioration.

## **Building No. 37, Commissary Storehouse**

### \* Emergency Repair of Roof

Repairing the north roof slope is essential to prevent continued serious deterioration of the flooring and floor framing. With 40% of the slates missing, repair of the slate roof is not practical. Deteriorated areas could either be covered with roll roofing material or all slates could be removed and new roll roofing or asphalt shingle roofing installed.

### Exterior Stabilization

Some maintenance pointing of the walls and especially of the chimneys is required. Iron anchors of the window grills are causing some bricks to spall. A pointing program might include removing all anchors.

### Gutters and Leaders

Restoring the built-in gutter system is not practical. New gutters and leaders should be installed in order to protect the bricks and mortar joints.

### Site

The maple saplings growing against the foundation should be removed.

## **Building No. 44, Bakery**

### \* Emergency Repair of Roof

There is a leak in the main roof that may be at the cupola and should be repaired immediately. The asphalt shingle roof appears to be near the end of its life. Rotted areas of the eaves soffit and eroded mortar just below indicate present or former leaks in the lining of the built-in gutters. A new roof of asphalt shingles should be installed and the cupola flashed. Ideally the gutters should have new linings. An alternative would be to roof over the gutters and install a new system at the eaves.

### Exterior Stabilization

There are areas of eroded mortar joints, especially on the east wall. A maintenance repointing would maintain the brick walls in good condition.

### Site

The maple trees growing against the foundation should be removed. The shrubs and vines around the building should be cut down and the grounds maintained.

## **Building No. 49, Post Exchange**

### Gutters and Leaders

The wide eaves and the system of gutters and leaders have protected the masonry walls and kept them in good condition. The gutters are in questionable condition; the gutter on the east wall is missing. The gutter system has leaders at either end of the south wall which are broken off. A new system of gutters and leaders should be installed with leaders at each end of both the north and south walls.

### Exterior Stabilization

The mortar joints on the east wall are eroded in some areas. Maintenance pointing is recommended.

## **Building No. 54, Barracks**

### Roof

The asphalt shingle roof is in poor condition and near the end of its life. A new roof of asphalt shingles or roll roofing should be installed. Ideally the gutters would have new linings and new leaders as part of a complete roofing program. An alternative in "mothballing" the building would be to roof over the gutters and install a new exterior system mounted on the crown molding.

### South Enclosed Porch

A major leak in the roof of the enclosed section of the south porch has caused the ceiling to fall and has rotted roof framing. The options are to repair the roof or to demolish this recent enclosure.

### Masonry Walls

The brick walls are in good condition. There is some eroded mortar and one significant crack down the east gable end of the main block. Maintenance repair and pointing of the brick walls would stabilize them and prevent further deterioration.

### Concrete Steps and Porch Floors

The original concrete steps and porch floors are the most deteriorated feature of Building No. 54. Repair would be costly and would probably not be a practical component of a "mothballing" program.

## **Building No. 55, Barracks**

### **\* Emergency Repair of Roof**

Leaks in the roof of the east wing have brought down the plaster ceiling and are causing deterioration of the wood framing members. Areas of missing shingles are evident on the east roof slope of the east wing. The roof shingles are visibly deteriorated on the west slope of the east wing and on the west slope of the west wing. Repairing the roof is essential to prevent continued serious deterioration of the interior fabric.

### **Gutters and Leaders**

The tern lining of the built-in gutter is deteriorated. Leaks are evident in staining of the soffit and bed molding and by eroded mortar under the soffit. A number of leaders are missing or broken off, again causing erosion of the mortar joints in their vicinity. Ideally the gutters would have new linings and new leaders as part of a complete roofing program. An alternative in "mothballing" the building would be to roof over the gutters and install a new exterior system mounted on the eaves.

### **Masonry Walls**

A large bulge is at the second floor of the south wall of the west wing. A similar bulge and crack is at the level of the attic floor in the south wall of the east wing where there is also a large crack between the center window and the foundation. Areas of mortar joints are eroded on most walls, primarily due to failure of the system of gutters and leaders. Maintenance repair and pointing of the brick walls would stabilize them and prevent further deterioration.

### **South Porch**

The roof of the south porch, which is the strip flooring of the original second level, is exposed. Areas of the flooring and framing are rotted and fallen. Temporary repairs to support new roofing should be made and new roll roofing installed to prevent further deterioration of this only remaining porch.

## **Building No. 60, Quarter Master's Storehouse**

### **Roof and Gutters**

The flat roof of the 1955 addition has a major leak. The asphalt shingle roof of the 1911 building has areas of missing shingles and appears to be near the end of its life. The tern-lined, built-in gutters appear to have significant leaks as evidenced by: dropped sections of soffit and bed molding; rust stains on the cornice; and moss and stains on the bricks under the eaves. Leaders are also missing. To prevent serious deterioration the roofs should be renewed and the gutter and leader system made functional. Either asphalt shingles or rolled roofing could be used on the 1911 building. Ideally, the built-in gutters would have new linings; but an alternative would be to cover them over and install gutters at the eaves.



#### Exterior Brick Walls

There are cracks in the foundation wall and areas of loose and eroded mortar. Mortar joints are eroded in areas of the brick wall and at the window grill anchors. On the east wall a crack extends from the second-floor door header to the bricked-in first-floor doorway. Some maintenance pointing of the stone and brick walls would stabilize their condition and prevent further deterioration. This program might include removal of the iron window grill anchors.

#### Other Exterior Stabilization

A program to mothball the building and stabilize the exterior for an extended period might include removing the corroded fire escapes. These will eventually become a safety concern; removing the fasteners in the masonry will also help to stabilize the walls.

### **Building No. 115, Fire Pump House**

#### Roof

Some asphalt shingle patches have blown off the roof, particularly at the hips, leaving sheathing exposed. The roof of the shed extension is in poor condition. New asphalt shingle hips should be installed on the roof and patches installed where necessary to make a tight roof and prevent further deterioration. A new asphalt shingle roof should be installed on the shed extension.

## FORT TERRY FORTIFICATIONS, 1900 – 1944

### PRESERVATION GOALS:

Slow down deterioration by clearing vegetation, especially removing vines with root systems in the concrete or brickwork.

The complex of fortifications at East Point appears to be of special significance due to the large number of structures and the intact setting. At this time it is believed that Battery Bradford and the Shelter for Searchlight No. 7 are unique examples. It is strongly recommended that before an undertaking having an adverse impact is considered that the East Point fortifications as a group be compared with other fortifications of this period in New York State and on the East Coast to determine how rare they are and their level of significance.

Seven of the nine intact batteries from the period 1900 – 1906 were used by PIADC from 1954 into the 1980s for large animal holding areas and for small animal breeding areas. Photographs taken in the 1960s show these batteries and the grounds around them to be well maintained. The batteries have been abandoned since the 1980s and are now heavily overgrown and are deteriorating. The major contributors to the cracking and spalling of the concrete are the root systems of this vegetation, which is predominately large poison ivy vines.

Because of their use by PIADC for a period of approximately 30 years, these batteries may be in relatively good condition compared to other surviving Endicott Period batteries.

The most effective and reasonable maintenance activity to slow down the deterioration of these historic batteries would be to remove the overgrowth and maintain the grounds around the batteries.

The deterioration of the other Fort Terry fortifications is also being accelerated by the heavy overgrowth around them and they would also benefit from a clearing program.

A number of fortification structures, including fire control structures and shelters for searchlights, have been abandoned since 1948. Some of these are in a state of ruin. For these structures there is no practical preservation treatment.

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# **HISTORIC RESOURCES SURVEY**

## **PLUM ISLAND, NEW YORK**

### **VOLUME 2**



#### **APPENDIX A**

#### **RESOURCES ASSOCIATED WITH THE PLUM ISLAND LIGHT STATION**

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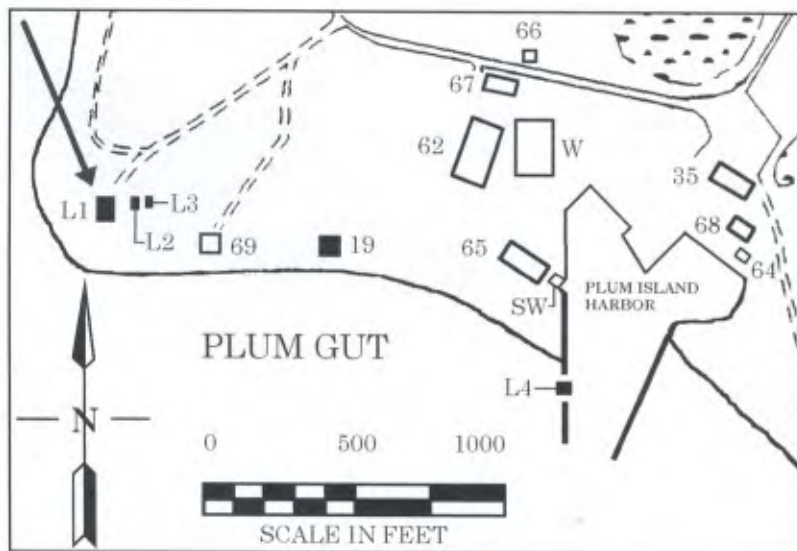
### APPENDIX A

### RESOURCES ASSOCIATED WITH THE PLUM ISLAND LIGHT STATION

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PLUM ISLAND LIGHTHOUSE. South and east walls, looking northwest. N1-16.



2. COUNTY: Suffolk TOWN: Southold VILLAGE: Plum Island
3. LOCATION: Northwest point of Plum Island on Plum Gut
4. OWNERSHIP: Public
5. PRESENT OWNER: United States Department of Agriculture  
AND ADDRESS: 14<sup>th</sup> and Independence Avenue Southwest  
Washington, D.C. 20250
6. USE: Original: Lighthouse Present: Abandoned
7. ACCESSIBILITY TO PUBLIC: Public access to Plum Island is restricted.

## **DESCRIPTION**

8. BUILDING MATERIAL: Granite walls; cast iron tower and lantern
9. STRUCTURAL SYSTEM: Masonry load-bearing walls
10. CONDITION: Fair
11. INTEGRITY: Original slate roof replaced with asbestos-cement shingle roof, date unknown. Modern kitchen and bathroom installed after 1940. Renovations during the 1960s and 1970s resulted in removal of some original interior trim; removal of original doors; covering original floor, wall and ceiling surfaces; and installing new sash in three windows. The fourth order Fresnel lens, pedestal and clockworks were removed in 1994.
14. THREATS TO BUILDING: The building is abandoned. Some immediate maintenance is required to prevent serious deterioration. Provision for long term maintenance is a concern.

The high land on which the lighthouse stands terminates in a bluff to the south and west which slopes steeply to the beach of Plum Gut 20' below. Erosion of this bluff will eventually undermine the lighthouse if no steps are taken to stabilize it. The lighthouse is approximately 60' from the edge of the bluff to the south and approximately 70' from the bluff to the west. The best historical reference to assess the rate of erosion is the 1926 "Post and Reservation Map, Fort Terry, New York" which at a scale of 1" = 200' clearly depicts the lighthouse and the line of the bluff. This map shows the lighthouse to be 140' from the bluff to the south and 110' from the bluff to the west in 1926. This indicates an average loss of 1' of bluff per year over the past 70 years.

15. RELATED OUTBUILDINGS AND PROPERTY: Three other buildings, one structure and one site are within the boundaries of the original three-acre lighthouse reservation. Three of these are related to the lighthouse: L2. Oil House; L3. Storage Shed and the 1992 steel frame carrying the operating Plum Island Light. Not historically related to the lighthouse are the site of Shelter for Searchlight No. 15 and Building No. 69, Submarine Cable Terminal.



An object historically related to the lighthouse, L4. Fog Bell was moved from the lighthouse reservation to the Plum Island Harbor breakwater.

16. SURROUNDINGS OF THE BUILDING: Open land; woodland; scattered buildings; water (Plum Gut).

17. INTERRELATIONSHIP OF BUILDING AND SURROUNDINGS: The Plum Island Lighthouse stands at the tip of a point on Plum Island which extends into Plum Gut. The front of the lighthouse faces south toward Plum Gut. The lighthouse stands at an elevation of 30' on a level man-made plinth approximately 50' x 50' with steep banks to the west, south and east. The lighthouse stands only 60' to 70' from the edge of the bluff to the south and southwest. This bluff is approximately 20' high and pitches steeply to the rocky beach. Further to the east and west the distance from the bluff edge increases. The land rises north of the lighthouse and is densely overgrown.

Approximately 40' east of the lighthouse stands L2. Oil House, and immediately east of that is L3. Storage Shed. These two buildings are on a level area that was the site of the keeper's dwelling for the original 1826 lighthouse. Further east and close to the beach is Building No. 69, Submarine Cable Terminal Building, a small building that receives the submarine electric cable from Orient Point.

Northwest of the lighthouse is the 1992 pipe-frame structure approximately 20' high carrying the active Plum Island light, an automated 190 mm lantern.

Southwest of the lighthouse directly at the edge of the bluff is the concrete foundation of Shelter for Searchlight No. 15.

The lighthouse is accessed by a dirt roadway which loops around the plinth on which the lighthouse stands.

Granite blocks on the reservation boundary are visible in the dirt road to the lighthouse and in the dirt road to Building No. 69.

#### 18. OTHER NOTABLE FEATURES OF BUILDING AND SITE:

##### **Exterior**

The two-story, gable-front lighthouse has an integral cast iron tower at the ridge. In plan the lighthouse measures 30' x 32' and has a 15' x 18' workroom extension on the rear (north) wall.

The granite rubble foundation is topped with a watertable course of 24" granite blocks. The 18" thick masonry walls are surfaced with rock-faced pink granite ashlar. The quoins and most stones conform to a 12" coursing; although the inclusion of much larger blocks and smaller blocks give the walls a more irregular appearance.

The walls are detailed with quoins at the corners and window surrounds composed of segmental-arch lintels, jambs and sills which are all of single rock-faced granite blocks. A projecting entrance pavilion at the center of the front facade is similarly treated with single blocks of granite forming the jambs and arched lintel. These blocks have a hammered surface and the jambs have chamfers creating a base and cap.

All the joints have been repointed. There are at least three different mortars on the front wall. The most prevalent is a portland cement mortar with local beach sand.

The masonry walls are generally in good condition with sound mortar joints. The south, west and east facades all have minor cracks, 1/6" to 1/8" wide, primarily in the mortar joints.

On west side of the south (front) facade a crack extends from the rake down the outer jambs of the second floor and first floor windows and then down to the watertable. On the east side a crack extends from the east tower bracket, down the inner jamb of the second floor window, over to and down the outer jamb of the first floor window. This crack was recently filled with portland cement, much of which is now missing or loose. Another crack extends down the east jamb of the center double window and the window sill is cracked at the center. The joint along the east door jamb has also opened.

On the east wall a crack extends the height of the wall along the outer jambs of the north windows.

Cracks extend the height of the west wall along both jambs of the south windows, reaching the watertable at the center of the first-floor window. A similar crack extends along the outer jambs of the north windows. The joint along the south jamb of the workroom wing window is also open.

The front doorway retains the original wood enframing which includes a three-light transom. The six-panel door with two glass lights probably dates from the 1960s. The back door is enclosed in a porch addition described below.

Both the front (south) and side walls are organized into three bays. On the front elevation the center entrance has a double window above; these have single windows to either side. Both the east and west side elevations have three windows on the first floor and two windows on the second floor. The first floor window at the west end of the north facade is a blind window. The north facade has two second-floor windows. The workroom wing has a single window on the north and west facades.

Fourteen windows retain the original six-over-six-light, double hung sash. The double window on the front facade retains the original four-over-four-light, double hung sash. One small window in the south gable and two in the north gable retain the original one-over-one-light, double-hung sash. Three windows have replacement sash that appear to date from the 1960s or 1970s: the two first floor windows at the

north end of the east facade and the window in the north facade of the workroom wing.

The window sash retain almost no paint or glazing compound. Some muntins are broken and some sills are rotted. The windows on the first and second floors are protected by recent wood storm sash.

A wood-frame enclosed porch against the east wall of the workroom wing shelters the workroom doorway and the original granite bulkhead providing access to the basement. The porch frame is of 2x4 and 4x4 lumber built on a poured concrete foundation. The walls are sheathed with vertical 1x6 boards. The shed roof is covered with wood shingles. The enclosed porch has a six-panel door with two lights and a window on the east wall with six-over-six-light, double hung sash.

The gable roof of the main block is covered with asbestos-cement shingles in straight courses. The roof shingles, copper ridge roll and copper lining of the built-in gutter are in good condition. At the ridge of the main roof is a single granite chimney; the mortar joints are deeply eroded.

The gable roof of the workroom wing is covered with asbestos-cement shingles in a diamond pattern. The roof was recently patched using asphalt sheet to replace missing shingles; a few shingles are cracked. The copper ridge roll and gutter lining are in good condition.

The boxed eaves incorporate built-in gutters. Leaders at the east end originally directed water to the cistern beneath the workroom; they now discharge at grade. The leader on the west side discharges against the foundation in an area with poor drainage.

The roof of the front entry pavilion has a cast iron eaves cornice of the same profile as that of the cast iron tower. The roofing is also iron.

The principal feature of the lighthouse is the one-story tower and lantern mounted at the ridge on the front facade. The tower contains the service room and the lantern housed the light apparatus. The base of the cast iron tower has two large scroll brackets extending onto and bolted through the granite face. Above the brackets the date "1869" is in cast iron numerals. From the square base the corners of the tower are chamfered creating an octagonal form, within which is the service room. The tower rises one story to the lantern balcony. A window in the front (south) face of the tower retains the original two-over-two-light, double-hung, iron sash. This window has a bold segmental-arch hood with brackets and a sill with brackets. Blind windows on the east and west faces of the tower have the same cast iron hood and sill. A bracket is missing from the east window sill. In addition to the window trim the cast iron tower is embellished with a base molding, scroll chamfer stops, and a crown molding at the lantern balcony.

Above the tower is the cast iron lantern balcony which has the same octagonal plan as the tower. The balcony is composed of four sections of cast iron plate. The upper surface has a raised diamond pattern. The replacement galvanized pipe railing around the balcony has solid round stanchions which are heavily corroded. A later set of pipe stanchions were installed next to the corroded stanchions. The stubs of the original railing stanchions remain at each corner.

There is significant corrosion of the balcony deck at the base plates of the two sets of replacement railing stanchions. Water appears to be trapped under these plates which are bolted to the balcony deck. The underside of the balcony is also corroded beneath these plates and sections on the east side are cracked. Water may be entering the interior of the balcony castings through the bolt holes of the replacement stanchions.

The approximate 7'- 8" diameter and 10' high cast iron lantern has a 3' 4" high drum wall on which a frame work of cast iron sills and astragals hold the ten glass panes (26 3/4" w. x 36" h.) of the lantern. The ten roof panels are cast with an integral cornice molding and with flanges with which they are bolted to each other and to the astragals. At the peak of the roof is a ball ventilator.

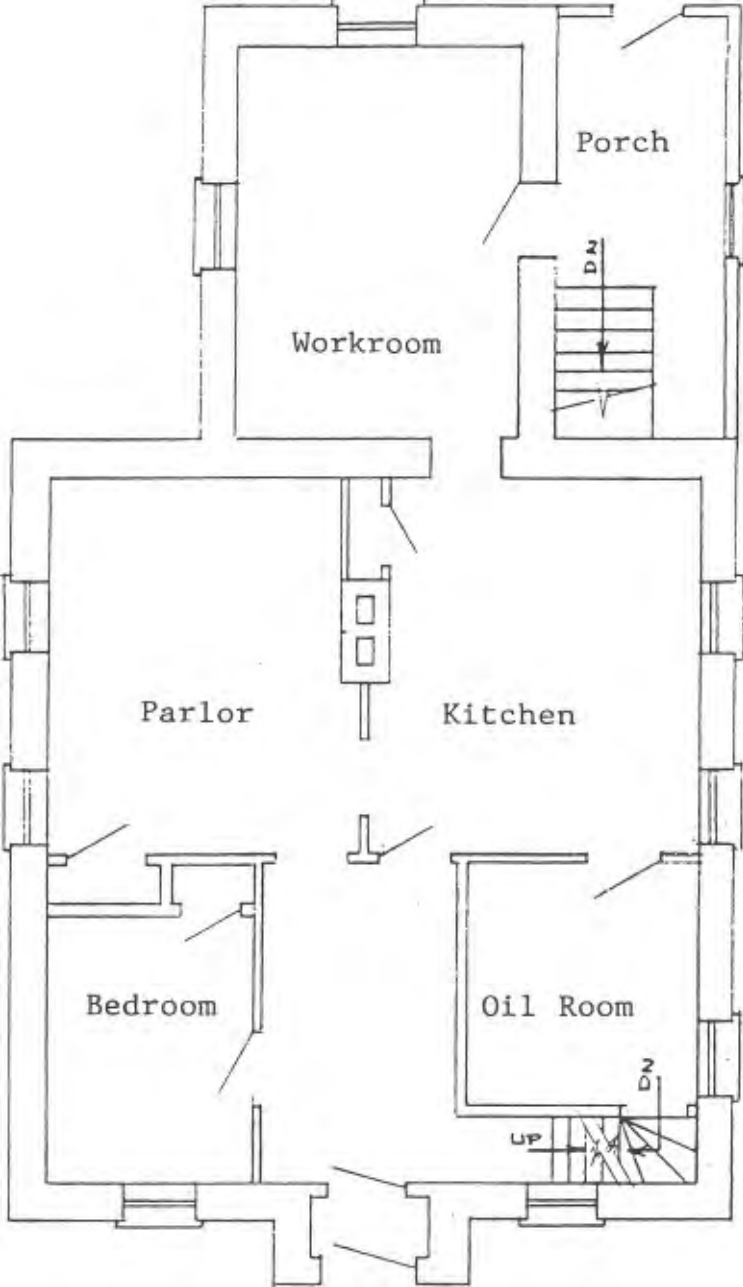
The door from the lantern to the balcony is frozen shut and the exterior of the lantern was not inspected. From the ground the lantern appears to be in fair condition.

## **Interior**

The first floor has an entrance hall, bedroom, oil room, kitchen, parlor, and workroom. The second floor has two chambers, a closet, a watchroom, and the stairway to the service room and lantern. See attached floor plans. Both floors have ceiling heights of 9'.

Significant changes to the interior include conversion of the first floor bedroom into a bathroom and conversion of the workroom into a kitchen. The original wide pine floor was later covered with strip flooring which is now covered with linoleum tiles. Many plaster wall surfaces are covered with plywood paneling probably installed in the 1960s or 1970s. When this paneling was installed a significant amount of interior woodwork was removed. The baseboards are missing from some rooms. Some door and window architraves were completely removed, on others only the architrave molding was removed. The plaster ceilings of some rooms were first covered with acoustic tiles. Suspended ceilings were later installed along with the plywood paneling on the walls.

The interior surfaces are in poor condition. On the walls and ceilings paint is peeling to the plaster. Paint on the woodwork is covered with mildew and mold and there is extensive intercoat peeling. Much of the ceiling plaster has fallen and much of what remains has separated from the lath. Areas of wall plaster have also fallen.





PLUM ISLAND LIGHTHOUSE

First Floor Plan



## **Basement**

The rubble walls of the basement are painted white. The concrete floor is recent. A brick partition and piers are beneath the tower.

## **First Floor**

Entrance Hall. The entrance retains the original plan, door and window casings and baseboard. The doorways to the kitchen and parlor are through a 14" partition which supports the tower; the paneled jambs have the same applied moldings as found on the one original doorway on the third floor. The plaster walls and ceiling are intact, although the ceiling plaster has separated from the lath and sections have fallen. The floor is linoleum. Doors are recent six-panel replacements. The doorway to the bedroom has a recent six-panel door.

Stairway. The stairway rises at the southeast corner between the exterior walls and the oil room walls. The stringers are original. The wood treads are covered with linoleum tiles.

Bedroom. This room served originally as a bedroom. It was converted at some time into a bathroom and retains a toilet, sink and shower stall. The floor is linoleum tile. The walls have a wainscot of marlite tiles with plaster above. The ceiling is plaster. The original door and window casings are intact. The six-panel doors to the hall and to the original closet are recent.

Oil Room. This room probably functioned as an oil room or storage room. It retains early storage cabinets on the south and west walls. The walls and ceiling are sound plaster and the floor is linoleum tile. The oil room retains the original window casings and baseboards. The doorways to the kitchen and basement stairway retain the original casings; the six-panel doors are recent. The open stairway to the basement appears to be original.

Parlor. This room was originally the parlor. It most recently served as a recreation room and retains a billiards table. The parlor has a linoleum tile floor; plywood paneled walls; and a suspended ceiling. The architraves were removed from the door and window casings and the baseboard is missing. The six-panel door to the original closet is recent.

Kitchen. This room was originally the kitchen. A cookstove would have connected to the chimney flue in the west wall. The kitchen has a linoleum tile floor; plywood paneled walls; and a suspended ceiling. Above the suspended ceiling is an acoustic tile ceiling. The plywood paneling is over gypsum wall board indicating the original plaster was removed. Both windows have recent casings and eight-light sash. No original trim remains at the workroom doorway. The doorways to the parlor, hall, oil room and original closet retain original casings, but the architraves are missing. The closet and oil room doorways have recent six-panel doors. The baseboards are missing.

Workroom. This was originally the lighthouse station workroom. A corbeled chimney stack in the attic indicates this room originally had a stove against the south wall. At some time the workroom was converted for use as the kitchen as evidenced by the metal kitchen cabinets and counter.

This room has a linoleum tile floor. Plywood paneling is on the walls to the height of a suspended ceiling now removed. Above the plywood is plaster, some of which has fallen. Much of the ceiling plaster has fallen and the remaining plaster is separated from the lath. Exposed lath shows evidence of water damage.

The original casings are missing from the doorways to the porch and to the kitchen. The doorway to the closet in the northeast corner retains the original casings, the architrave is missing. The six-panel doors to the closet and porch are recent. The west window retains the original casings. The north window has casings and sash dating from the conversion to a kitchen. The original baseboards are missing.

A trap door at the center of the workroom opens to a large brick cistern which was originally supplied by the gutters and leaders. Within the trap door opening can be seen the wood strip flooring under the linoleum and the original 1 x 9 pine flooring.

Porch. The wall framing and exterior sheathing is exposed within the enclosed porch. Beaded paneling is on the ceiling. The floor is concrete and a granite step is at the workroom door. The doorway to the workroom, originally an exterior door, has jambs and lintel of single blocks in the same manner as the windows. The doorway retains the original wood door frame, but the door is recent. The granite walls of the bulkhead contain recent concrete steps. An abandoned leader goes through the wall to the cistern beneath the workroom.

## **Second Floor**

Hall. The hall has a linoleum tile floor and plaster walls and ceiling. Window casings and the baseboard are original. The doors to all rooms except the stairway have the original casings and recent six-panel doors. The stairway appears to have originally been open to the hall. At an early date it was closed off with 1 x 8 vertical paneling. The batten door is of the same beaded paneling.

Closet. This small room was originally a storage closet for supplies required in the lantern. It was most recently used as an office. This room has a linoleum floor; plywood paneled walls; and a suspended ceiling. The original plaster ceiling has areas of missing plaster and evidence of water damage. Both windows retain the original casings, but the architraves are missing. The original door casings are missing. The original baseboard remains.

Stairway. This small room contains the open stairway to the third floor. The original turned newel, balusters and hand rail are intact. The room has a linoleum floor and plywood paneled walls. The plaster ceiling was taken down. The original window casings and baseboard remain.

Watch Room. This room was originally used by the keeper during his nighttime watch. The watch room has a linoleum floor; plywood paneled walls; and a plaster ceiling. The original window and door casings and the baseboard are intact. The six-panel door to the original closet is recent.

East Chamber. This chamber has a linoleum tile floor; plywood paneled walls and a plaster ceiling. A large area of plaster has fallen due to water damage. Window casings and the baseboard are original. The doorways to the hall and original closet retain the original casings and have recent six-panel doors.

West Chamber. This chamber has a linoleum tile floor; plywood paneled walls and a plaster ceiling. The original window casings and baseboard remain. The doorways to the hall and original closet retain the original casings and have recent six-panel doors.

### **Third Floor**

Stairhall. The stairhall has a linoleum tile floor and plywood paneled walls. The plaster ceiling is separated from the lath due to moisture damage. The open stairway to the service room has wood stringers and treads. The square, tapered newel is missing the cap and the railing is missing. The doorway to the attic retains the original 1 1/4" door. The door has four panels which are flush on one side and have applied moldings on the other. The door retains the original hinges, cast iron rim lock and white porcelain knob.

Attic. Within the unfinished attic is the rubble interior of the masonry walls; the 3" x 8" pine rafters and 4" x 10" pine purlins of the roof frame; 1" x 12" pine roof sheathing intended for the original slate roof; and 9" pine floorboards.

The 1/2" boiler plate tower walls end 5' above the third floor, corresponding to the exterior brackets. Iron posts, 4" x 4", bolted to the tower walls extend to I-beams in the floor which are supported by partitions extending to the brick piers in the basement.

### **Tower**

Service Room. The octagonal service room is 7' - 6" across and has a 9' ceiling. The walls retain the original 4 1/2" beaded paneling and an early built-in cabinet. The floor is linoleum tiles. The stairway down to the second floor retains the original turned newel and handrail at the stairwell, but the balusters are missing. An open stairway with wood stringers and treads and a square, tapered newel leads up to the



lantern room. The service room ceiling is the underside of the lantern deck composed of four cast iron panels cast with flanges through which they are bolted together.

Lantern Room. The drum wall is composed of six cast iron sections with flanges bolted to the lantern deck. One panel contains the doorway to the lantern balcony. Four vents are missing the handles used to open and close them.

The pedestal, clockworks and fourth order Fresnel lens were removed in 1994 leaving the lantern room empty. (The pedestal, clockworks and lens are presently on display at the East End Seaport and Marine Foundation in Greenport, New York.) The ghost of the pedestal is evident in the iron floor.

Five of the lantern panes are cracked. Water leaking through has caused severe corrosion of the cast iron sills and especially of the rabbets for the glass panes. Corrosion is also evident at the base flange of the drum wall, indicating water may be driven in at the intersection of the balcony and drum wall. All interior paint is peeling to the iron.

### SIGNIFICANCE

#### 19. DATE OF INITIAL CONSTRUCTION: 1869-1870

ARCHITECT: Unknown

BUILDER: Unknown

20. HISTORICAL AND ARCHITECTURAL IMPORTANCE: The Plum Island Lighthouse is historically significant as part of the system of aids to navigation through the eastern entrances to Long Island Sound built by the Federal government from 1806 to 1899 and remaining active today. This system of lighthouses had regional significance aiding the coastal trade of New York, Connecticut, Rhode Island and Massachusetts. The Plum Island Lighthouse was built in 1869 and remained a manned station until it was deactivated in 1978. The Plum Island Lighthouse is architecturally significant as one of six examples of the Third Light-House District's standard plan for a fourth order lighthouse; other examples are found on Long Island, Rhode Island and Connecticut. This group of lighthouses have a cohesive design in the Italianate style which is complimented by the tower mounted on the roof. The design is distinguished by the rock-faced granite walls simply articulated by quoins and arched granite window and door surrounds. The Italianate features of the cast iron tower include bold scroll brackets which anchor the tower to the masonry and bracketed cast iron window hoods and sills. The Plum Island Lighthouse retains a high degree of architectural integrity on the exterior.

Plum Island, Great Gull Island, Little Gull Island and Fishers Island extend in a line from Orient Point on Long Island's North Fork across to Watch Hill, Rhode Island. This line of islands is the eastern terminus of Long Island Sound and the passages between them (Plum Gut, the Race, and Fisher's Island Sound) are the

entrances to Long Island Sound. Establishing lighthouses to mark the eastern passages into and out of Long Island Sound was a high priority in the Federal government's developing system of aids to navigation. A lighthouse was built on Little Gull Island in 1806 to guide shipping through the Race and the following year the Watch Hill Lighthouse was constructed to serve Fisher's Island Sound. In 1827 the first Plum Island Lighthouse was built on the eastern shore of Plum Gut. These first three lighthouse were augmented by Race Rock Lighthouse in 1878 and the Orient Point Lighthouse in 1899 which established the present system of five lighthouses at the eastern entrance to Long Island Sound.

In 1826 the Federal government purchased approximately three acres comprising the tip of the northwest point of Plum Island. This promontory in Plum Gut is visible from all approaches to this passageway between Orient Point and Plum Island. The lighthouse built in 1827 was a 30' stone tower carrying an iron lantern. The 1839 "United States Coast Survey" depicts the reservation boundaries, the lighthouse and the separate keeper's dwelling. The 1827 lighthouse tower appears to be at the same location as the present 1869 lighthouse. The keeper's dwelling is shown to be on what is now a level plateau in front of L2. Oil House. The 1827 keeper's dwelling was still standing in 1879 as seen in two photographs by George B. Brainard taken that year. It is a one-and-one-half-story, side-gable dwelling with a center chimney and a three-bay front facade with a center entrance facing south.

In 1852 the U.S. Congress established a new agency, the Light-House Board, to bring efficient management and the highest technology to the country's system of aids-to-navigation. One of the primary goals was to introduce the Fresnel lens into American lighthouses. The Light-House Board classified all lighthouses according to their function and the distance their signal should carry. The classification was based upon the six orders of Fresnel lenses. Major seacoast lights were equipped with the largest first order lenses; minor harbors and breakwaters would be outfitted with the smallest sixth order lens.

The Light-House Board priority was the system of first order lighthouses on the seacoasts. By 1867 the engineers of the Third Light-House District turned their attention to a system of fourth order lighthouses serving Long Island Sound, Fisher's Island Sound, Gardiner's Bay and Block Island Sound. The Third District engineers developed a standard plan for a fourth order lighthouse with an integral keeper's dwelling and between 1867 and 1869 built six such lighthouses: the 1867 Block Island North Lighthouse, the 1868 Norwalk Island Lighthouse (Conn.), the 1868 Great Captain Island Lighthouse (Conn.), the 1868 Morgan Point Lighthouse (Conn.), the 1868 Old Field Point Lighthouse (N.Y.) and the 1869 Plum Island Lighthouse.

The 1827 Plum Island Lighthouse tower was reported to be in poor condition after an inspection in 1868. Rather than repair the existing tower, the Third District engineers chose to build their new standard fourth order lighthouse. The new Plum Island Lighthouse was outfitted with a fourth order revolving Fresnel lens. The two 1879 photographs by George B. Brainard depict the lighthouse only ten years after it

was built. Also seen in these photographs is the fog-bell tower to the west of the lighthouse which was established in 1871 and a boat house on the shore at the east boundary of the reservation next to a wharf extending into Plum Gut.

The Plum Island Lighthouse was deactivated in 1978. An automated light was first set on a pole attached to L2. Oil House. This was moved in 1992 to a new pipe-frame tower.

The Plum Island Lighthouse is architecturally significant as one of a group of six regional lighthouses of the same design which successfully join lighthouse function with architectural style. These are also one of the first important series of integral lighthouses, with the tower rising from the roof of the keeper's dwelling. The Plum Island Lighthouse has the gable-front form popularized by the Greek Revival and the nearly square plan also associated with the Greek Revival and Italianate styles. The influence of the Italianate style is most clearly evident in the segmental-arched windows and doorways; the quoins at the corners; and in the brackets, scroll chamfers and window ornamentation of the cast iron tower. Italianate residences often featured towers or cupolas; the lighthouse tower compliments the overall Italianate character of the design. On the front facade the alignment of the entrance pavilion, double window on the second floor and the cast iron lantern are a composition with the features of an Italianate tower.

In commercial architecture of the period, cast iron decorative components were used to create elaborate Italianate building fronts. The Third District engineers also recognized the usefulness of using the same cast iron components for the decorative features of the towers of this series of lighthouses.

The cast iron lantern is of the Light-House Board's standard design as published in their 1862 Book of Lithographs. The only difference is that the lantern wall beneath the glazing is circular instead of the ten panels shown on the standard plan.

## 21. SOURCES:

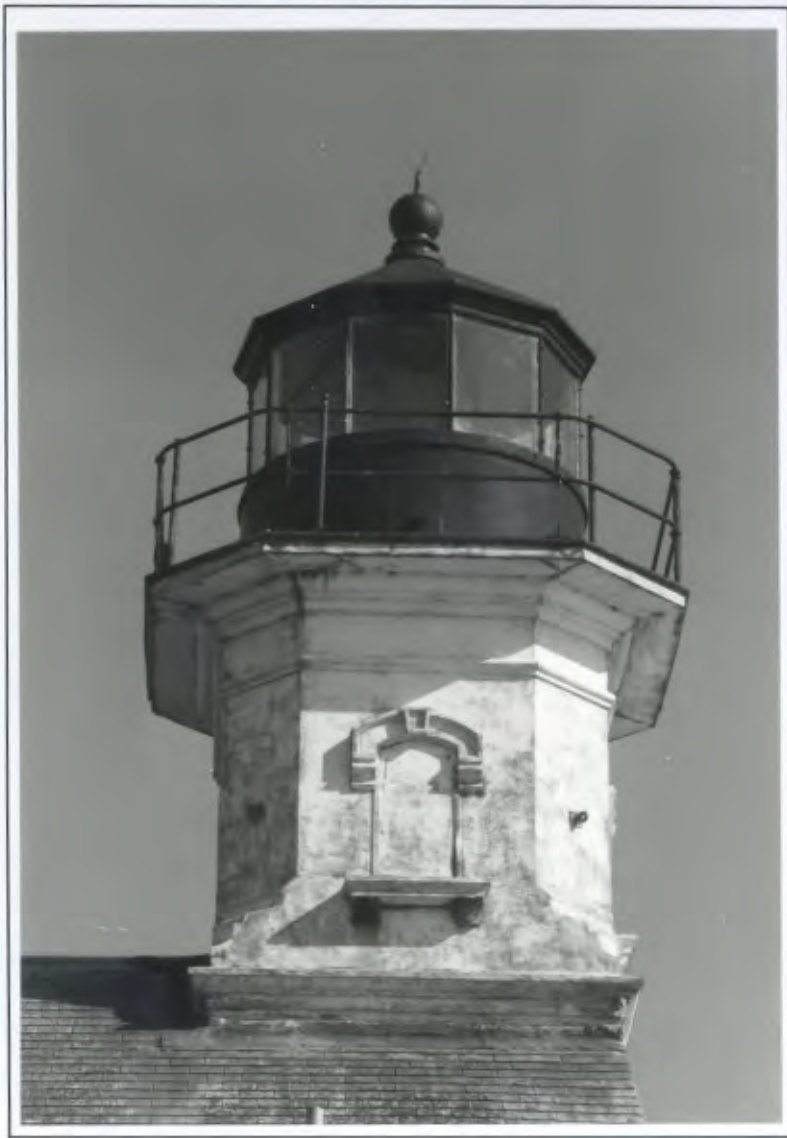
Robert G. Bachand. Northeast Lights. Norwalk, Conn.: Sea Sports Publications. 1989.

Harlan Hamilton. Lights & Legends. Stamford, Conn.: Westcott Cove Publishing Co. 1987.

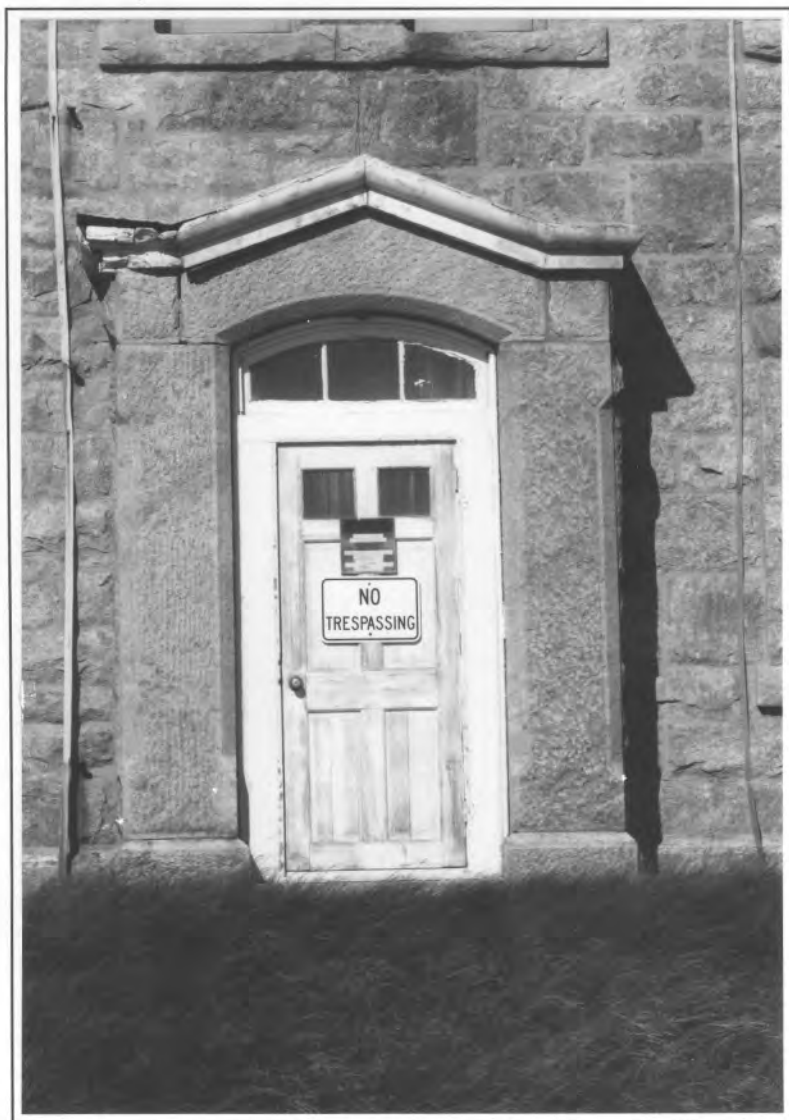
F. Ross Holland, Jr. Great American Lighthouses. Washington, D.C.: The Preservation Press. 1989.

Light-House Board. Book of Lithographs. 1862. Plate 23, Details of Cast Iron Lantern for 4th, 5th & 6th Order Lenses.

"Plum Island Lighthouse Exterior Renovation" Two sheets of architectural drawings dated August 3, 1984. PIADC.



PLUM ISLAND LIGHTHOUSE. Detail of tower and lantern, looking west. N17-18.



PLUM ISLAND LIGHTHOUSE. Detail of south entrance. N17-5.









# BUILDING-STRUCTURE INVENTORY FORM

NYS OFFICE OF PARKS, RECREATION  
& HISTORIC PRESERVATION  
DIVISION FOR HISTORIC PRESERVATION  
518-237-8643

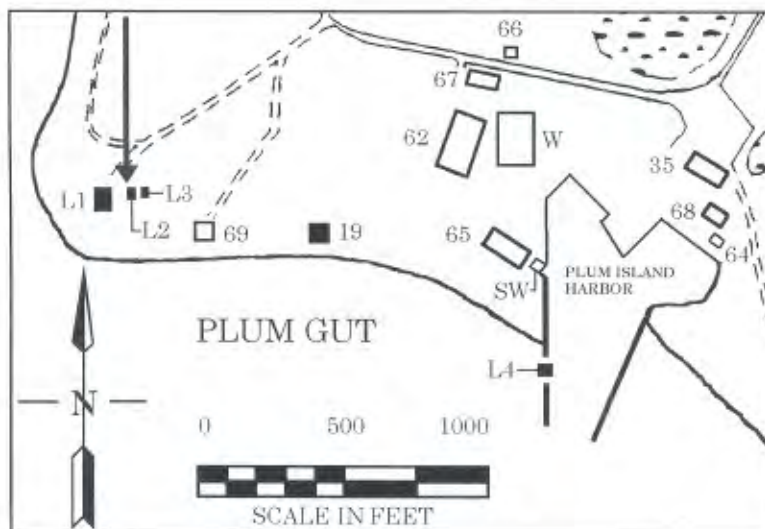
Unique Site No. \_\_\_\_\_  
Quad \_\_\_\_\_  
Series \_\_\_\_\_  
Neg. No. \_\_\_\_\_

## IDENTIFICATION

1. BUILDING NAME: **L2. PLUM ISLAND LIGHT STATION OIL HOUSE**



PLUM ISLAND LIGHT STATION OIL HOUSE. West and south walls, looking northeast. N1-19.



2. COUNTY: Suffolk TOWN: Southold VILLAGE: Plum Island
3. LOCATION: Northwest point of Plum Island on Plum Gut
4. OWNERSHIP: Public
5. PRESENT OWNER: United States Department of Agriculture  
AND ADDRESS: 14<sup>th</sup> and Independence Avenue Southwest  
Washington, D.C. 20250
6. USE: Original: Oil House Present: Abandoned
7. ACCESSIBILITY TO PUBLIC: Public access to Plum Island is restricted.

## **DESCRIPTION**

8. BUILDING MATERIAL: Brick laid in common American bond
9. STRUCTURAL SYSTEM: Masonry load-bearing walls
10. CONDITION: Good
11. INTEGRITY: The Oil House is on its original site. The Oil House retains a high level of integrity. The only alterations are the replacement asphalt shingle roof and the replacement door.
14. THREATS TO BUILDING: The Oil House is in good condition, but is abandoned and long term maintenance is a concern.
15. RELATED OUTBUILDINGS AND PROPERTY: Plum Island Lighthouse and Light Station Storage Shed.
16. SURROUNDINGS OF THE BUILDING: Open land; woodland; scattered buildings; water (Plum Gut).
17. INTERRELATIONSHIP OF BUILDING AND SURROUNDINGS: The Oil House stands 40' to the east of the Plum Island Lighthouse. The Oil House is on a level terrace which was the site of the keeper's dwelling for the original 1826 lighthouse. A few feet to the east is the Light Station Storage Shed. The Oil House is becoming overgrown with shrubs and vines.
18. OTHER NOTABLE FEATURES OF BUILDING AND SITE: This one-story, gable-roofed building is 11' 6" x 15' - 6" in plan.

The brick walls are laid in common American bond with a course of headers every sixth course. Three brick vents are at the peak of each gable. The bricks retain traces of the former white paint.

The front doorway in the south wall has a rowlock arch head and a replacement three-panel door. There are no windows.

The gable roof is covered with asphalt shingles which were installed over a layer of wood shingles.

The interior is a single room with a concrete floor and painted brick walls.

## **SIGNIFICANCE**

19. DATE OF INITIAL CONSTRUCTION: ca. 1900

ARCHITECT:

BUILDER:

20. HISTORICAL AND ARCHITECTURAL IMPORTANCE: The ca. 1900 brick Oil House is a contributing feature of the Plum Island Light Station. The Oil House is an intact example of an important Light-House Establishment building type which recalls the evolution of the technology of lamps and fuel used to illuminate the lighthouse optic.

The brick Oil House is the standard design constructed by the United States Light-House Establishment at the turn of this century. For example, a 1904 oil house at the Montauk Point Light Station is of the same type.

At the Plum Island Lighthouse, lamp oil was originally stored in the basement and in the first-floor oil room. The construction of separate oil houses was often associated with installation of new lamps in the optic that burned mineral oil. Incandescent Oil Vapor lamps were being installed in the lighthouses of the Third Light-House District in the first decade of this century. The Oil House at Plum Island was probably built to store the mineral oil for this new lamp.

The Oil House is depicted on the 1926 "Post and Reservation Map, Fort Terry, New York." A ca. 1958 photograph (negative N718) shows the Oil House with the brick walls painted white and a standing-seam metal roof, which may be the original.

The Oil House was used to store mineral oil up to the time the light was electrified. The building continued to be used by the Coast Guard for storage until 1978 when the light was automated. Although the property was transferred from the Coast Guard to the Department of Agriculture in 1978, PIADC never used the Oil House.

21. SOURCES:

"Coast Guard Lighthouse" PIADC negative N718. Ca. 1958.

"Post and Reservation Map, Fort Terry, New York." Quarter Master's Office, Fort H.G. Wright. September 1926.





2. COUNTY: Suffolk TOWN: Southold VILLAGE: Plum Island
3. LOCATION: Northwest point of Plum Island on Plum Gut
4. OWNERSHIP: Public
5. PRESENT OWNER: United States Department of Agriculture  
AND ADDRESS: 14<sup>th</sup> and Independence Avenue Southwest  
Washington, D.C. 20250
6. USE: Original: Storage Present: Abandoned
7. ACCESSIBILITY TO PUBLIC: Public access to Plum Island is restricted.

## **DESCRIPTION**

8. BUILDING MATERIAL: Drop siding
9. STRUCTURAL SYSTEM: Wood frame with light members
10. CONDITION: Fair
11. INTEGRITY: The Storage Shed is on its original site. The original single doorway in the north wall was widened and fitted with an overhead garage door after 1958. This is the only significant exterior alteration.
14. THREATS TO BUILDING: The building is in fair condition. It is abandoned and provision for maintenance is a concern.
15. RELATED OUTBUILDINGS AND PROPERTY: Plum Island Lighthouse and Light Station Oil House
16. SURROUNDINGS OF THE BUILDING: Open land; woodland; scattered buildings, water (Plum Gut).
17. INTERRELATIONSHIP OF BUILDING AND SURROUNDINGS: The Storage Shed faces north. The Storage Shed stands 50' to the east of the Plum Island Lighthouse. The Storage Shed is on a level terrace which was the site of the keeper's dwelling for the original 1826 lighthouse. A few feet to the west is the Oil House.

Grass is maintained around the Storage Shed, except where the west wall is becoming overgrown with vines and shrubs.

18. OTHER NOTABLE FEATURES OF BUILDING AND SITE: This one-story, gable-roofed building is 12' x 22' in plan.

The frame walls are covered with drop siding having a 7" exposure to the weather. The drop siding retains traces of the former white paint.

The wide doorway in the north wall and the overhead garage door date from after 1958. The east and west walls each have two windows with the original four-light fixed sash.



The gable roof is covered with asphalt shingles.

The interior is one room with a gravel floor. Wall and roof framing (2" x 4") and sheathing is exposed.

### **SIGNIFICANCE**

19. DATE OF INITIAL CONSTRUCTION: ca. 1920 - 1926

ARCHITECT:

BUILDER:

20. HISTORICAL AND ARCHITECTURAL IMPORTANCE: The Storage Shed is depicted on the 1926 "Post and Reservation Map, Fort Terry, New York." The 2" x 4" lumber in the frame and the drop siding suggest it was built shortly before that date.

The building was probably intended for storage of some kind. Further research is needed to determine the exact original use.

A ca. 1958 photograph (negative N718) shows the Storage Shed with the original single doorway in the north wall. The drop siding is painted white.

The building continued to be used by the Coast Guard until 1978 when the light was automated. Although the property was transferred from the Coast Guard to the Department of Agriculture in 1978, PIADC never used the Storage Shed.

Further research recommended for the Plum Island Lighthouse should also provide the information to determine the original function and to evaluate the significance of the Storage Shed.

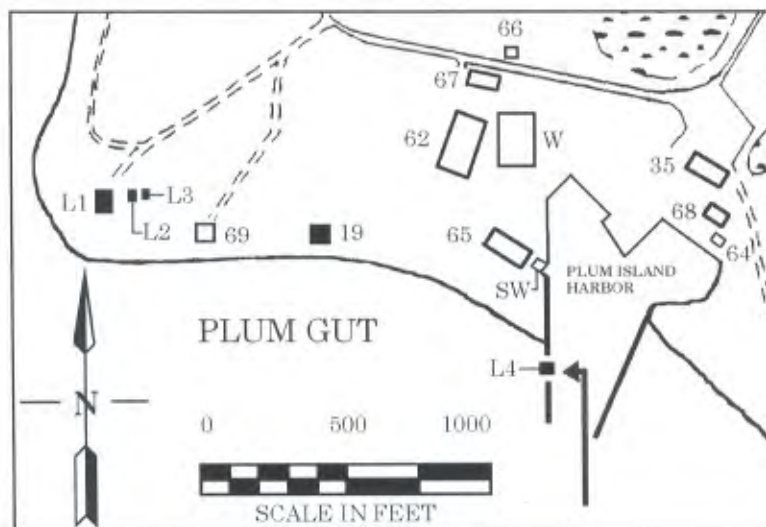
21. SOURCES:

"Coast Guard Lighthouse" PIADC negative N718. Ca. 1958.

"Post and Reservation Map, Fort Terry, New York." Quarter Master's Office, Fort H.G. Wright. September 1926.



PLUM ISLAND LIGHT STATION FOG BELL. Fog bell on timber framework at Plum Island Harbor breakwater. N10-35A.



2. COUNTY: Suffolk TOWN: Southold VILLAGE: Plum Island
3. LOCATION: On west breakwater at entrance to Plum Island Harbor
4. OWNERSHIP: Public
5. PRESENT OWNER: United States Department of Agriculture  
AND ADDRESS: 14<sup>th</sup> and Independence Avenue Southwest  
Washington, D.C. 20250
6. USE: Original: Fog Bell Present: Abandoned
7. ACCESSIBILITY TO PUBLIC: Public access to Plum Island is restricted.

## **DESCRIPTION**

8. BUILDING MATERIAL: Bronze
9. STRUCTURAL SYSTEM:
10. CONDITION: Good
11. INTEGRITY: The fog bell is intact. The bell house, weight tower and the Steven's striking apparatus are missing. The fog bell was relocated at an unknown date to the Plum Island Harbor breakwater where a new timber framework was built to carry it.
14. THREATS TO BUILDING: The timber framework from which the fog bell hangs in seriously deteriorated.
15. RELATED OUTBUILDINGS AND PROPERTY: Plum Island Lighthouse
16. SURROUNDINGS OF THE BUILDING: Plum Island Harbor
17. INTERRELATIONSHIP OF BUILDING AND SURROUNDINGS: The fog bell is carried on a timber tower on the rip rap breakwater extending from Plum Island Harbor into Plum Gut.
18. OTHER NOTABLE FEATURES OF BUILDING AND SITE: The cast bronze bell has extruded lettering: "U.S. LIGHT HOUSE ESTABLISHMENT." The iron bell carriage and iron clapper do not appear to be original components.

The fog bell is hung from an open timber structure. Two legs of the structure are supported on piers in the channel and the other two stand on the breakwater. The timbers are connected with bolts and tie rods.

## **SIGNIFICANCE**

19. DATE OF INITIAL CONSTRUCTION: ca. 1871  
ARCHITECT:  
BUILDER:

20. HISTORICAL AND ARCHITECTURAL IMPORTANCE: A fog bell and Steven's striking apparatus were installed at the Plum Island Light Station in 1871.

A photograph of the Plum Island Light Station by George B. Brainard dated August 31, 1879 shows the bell house just west of the lighthouse. This small building housed the Steven's striking apparatus. The bell was on a porch oriented toward Long Island Sound. The open timber tower over the bell house provided a drop for the weights which drove the clockworks mechanism of the Steven's striking apparatus. The clockworks caused a hammer to strike the fog bell once every 15 seconds.

Further research recommended for the Plum Island Lighthouse should also provide information on the fog bell, including the period during which it was active.

At some time the fog bell was relocated to the Plum Island Harbor breakwater and outfitted with a conventional clapper that could be activated by pulling a line attached to it.

The fog bell is a rare survivor of an early type of fog signal. The presence of the fog bell on Plum Island and the continued ownership of the 1856 fourth order lens may make the Plum Island Lighthouse one of a very few to retain their nineteenth-century optic and fog signal.

#### 21. SOURCES:

Bachand, Robert G. Northeast Lights. Norwalk, Conn.: Sea Sports Publications. 1989.

Brainard, George B. "Plum Island Lighthouse". Number 372 and 373. August 31, 1879. Society for the Preservation of Long Island Antiquities.

**Conservation Strategies  
for the  
Orient Point to Plum Island Important Bird Area**

**June 2009**

**The Orient Point to Plum Island Conservation Committee**

## **Background**

In the fall of 2005, Audubon New York convened a group of natural resource professionals and stakeholders to identify strategies to help protect the Orient Point to Plum Island (OPPI) Important Bird Area (IBA). Audubon's IBA program is part of a global effort to identify sites that are critical for maintaining bird populations and to work towards their conservation. In addition to this area's significance to birds, the growing momentum behind the Long Island Sound Stewardship Act (Appendix A) made this site prime for a conservation planning effort.

The purpose of the project was to facilitate conservation of the area by involving different interest groups in the protection of the site, increase public awareness of the site's importance, and engage more people in conservation. This project also served as a model for educating and engaging the public in the Long Island Sound Stewardship Initiative, as well as for implementing stewardship actions at specific sites. The OPPI IBA conservation committee reconvened in the Fall 2007 and updated conservation strategies in Spring 2008. This report summarizes the work carried out over the past three years and is intended to help guide future efforts to protect this incredible natural resource. Audubon New York received a grant from the National Fish and Wildlife Foundation to support this work.



## **Introduction**

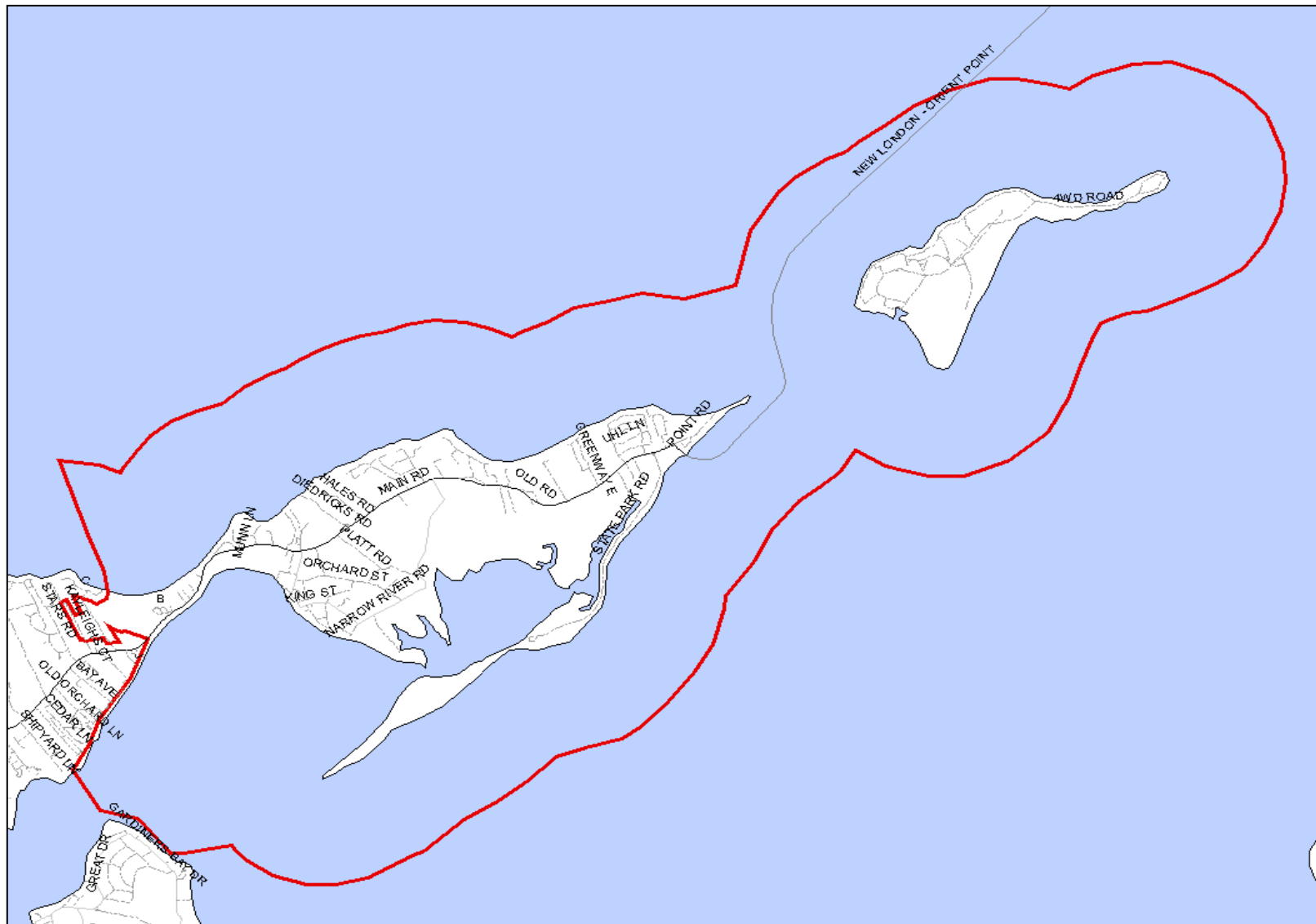
### ***Important Bird Area Program***

In the mid-1990s, Audubon New York's Important Bird Area (IBA) Program was initiated with the goal of identifying sites within the state that are most important to birds and to protect and promote proper management of those sites for the long-term conservation of birds, other wildlife, and their habitats. The New York IBA program was patterned after the efforts of BirdLife International that began in Europe and have since spread to many parts of the globe. As such, IBAs in New York are identified on the basis of criteria similar to those used throughout the world, which focus on threatened species, biome-restricted assemblages, and congregations of birds. With the oversight of a committee of ornithological experts from around the state and site nominations provided by individuals, Audubon chapters, bird clubs, and natural resource professionals, 136 IBAs have been identified in New York. This network of IBAs has provided a solid foundation to build conservation efforts aimed at protecting the full diversity of avian species in the state.

### ***Site Description and Significance to Birds***

The Orient Point to Plum Island IBA includes land and water on the North Fork of Long Island, extending from Orient Harbor in the east to Plum Island in the west and including Orient Beach State Park. Between Orient Point and Plum Island lies Plum Gut, a deep open water channel that links the waters of Gardiners Bay with the waters of eastern Long Island Sound (Figure 1). The habitats of particular significance to birds and other wildlife include barrier beaches, salt marshes, shallow bays, and maritime forests. Plum Island has a mixture of rocky shoreline, sand beaches, wetlands, and various upland shrub, grassland, and forest habitats.

This site met the IBA species at-risk criterion for number of breeding Piping Plover, Common Tern, and Least Tern. It also met the waterbird congregation criterion because of the number of Common and Roseate Terns courting and fishing in the area between Plum Island and Orient Point (Table 1). In addition, Ospreys nest and forage in the marshes and the area is an important waterfowl wintering area with substantial numbers of Canada Geese, American Black Ducks, Mallards, Canvasbacks, scaup, Long-tailed Ducks, scoters, Buffleheads, Common Goldeneyes, and Red-breasted Mergansers. Recently obtained data indicate that this site also meets the waterfowl congregation IBA criterion, which will be presented to the IBA technical committee during the next IBA site review process.



**Figure 1.** The Orient Point to Plum Island IBA outlined in red, Town of Southold, NY. Conservation Committee members agreed on this boundary for this process, although noted that the boundary omits areas further offshore where wintering waterfowl congregate.

**Table 1.** IBA Criteria met at the Orient Point to Plum Island IBA.

<i>Criterion</i>	<i>Species</i>	<i>Data</i>	<i>Season</i>	<i>Source</i>
Species at Risk	Piping Plover	1 pair in 2002, 1 in 2001, 7 in 1998, 6 in 1997, 9 in 1996, 5 in 1995, 8 in 1994, 5 in 1993	Breeding	NY Natural Heritage Biodiversity Databases
Species at Risk	Common Tern	At least 40 nesting pairs	Breeding	Mike Wasilco pers. comm. 2004
Species at Risk	Least Tern	27 pairs in 1998, 16 in 1997, 108 in 1996, 23 in 1995, 16 in 1994, 48 in 1993	Breeding	NY Natural Heritage Biodiversity Databases
Congregations- Waterbirds	Terns	300+ Common and Roseate Terns courting and fishing in the area between Plum Island and Orient Point	Breeding and migration	Mike Wasilco pers. comm. 2004

### ***Historical and Cultural Background***

Orient is the eastern-most hamlet in the town of Southold on Long Island's North Fork. It was originally named Poquatuck, after the name of the local native American tribe that resided along the inland waterways. It was later named Oyster Ponds due to the abundance of shellfish in the area. It is said that the name was then changed to Orient to match the name of its most prominent land feature, Orient Point. The hamlet was originally settled by five families given a land grant by the King of England in the 1600's, and their names King, Terry, and Latham still resonate to this day. Later, Orient was used as a base of operations by British commanders such as Benedict Arnold and local Tories during the American Revolution to conduct raids on Yankee-held Connecticut.

Orient's population was 662 at the 2000 census and increases to well over 1,000 in the summer months. Other than a post office, a gas station, and a few seasonal tourist stands, there is no center of commerce and residents depend on nearby Greenport for every-day necessities. Many make a living at the US Government's Department of Agriculture lab on nearby Plum Island, a 15 minute boat ride from Orient Point across Plum Gut, or at businesses further inland. There is also truck farming and commercial fishing industry.

Agriculture has played a key role in the history of Plum Island since Samuel Wyllys bought it from Chief Wyandanch, sachem of the Montauk Indian tribe, on April 27, 1659. Part of their agreement was that Wyllys would be able to pasture his cattle on the island free from interference. In 1897, the U.S. government acquired 130 acres on the island to construct harbor and coastal defense facilities. Two years later, the island became home to Fort Terry, and was used as a look out point throughout World War II.

In 1954 the U. S. Department of Agriculture acquired the island and established the modern-day Plum Island Animal Disease Center (PIADC), a high-security biocontainment facility, to research foreign animal diseases that impact livestock. In 2002 the PIADC facility was transferred from the U. S. Department of Agriculture to the U. S. Department of Homeland Security (Appendix B).

### ***Other Noteworthy Ecological features***

Several regionally rare plant species occur here, including Scotch loveage (*Ligusticum scothicum*), slender knotweed (*Polygonum tenue*), and sea-beach knotweed (*Polygonum glaucum*). A stand of blackjack oak (*Quercus marilandica*) represents the northernmost extent of the range of the species. Orient Harbor supports a significant bay scallop (*Aequipecten irradians*) commercial shellfishery and is an important spawning, nursery, and feeding area for a variety of fish. The offshore waters, especially of Plum gut, host large concentrations of striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), tautog (*Tautoga onitis*), summer flounder (*Paralichthys dentatus*), and others. Plum Gut is a major migration corridor for striped bass and Atlantic Salmon (*Salmo salar*).

The Christmas Bird Count that almost completely covers this site is one of the oldest counts in the United States and was started by the great naturalist, Roy Latham of Orient.

### ***Conservation Committee Members***

Participants in this process represented the U.S. Department of Homeland Security, U.S. Department of Agriculture, North Fork Audubon Society, Eastern Long Island Audubon Society, Audubon New York, Peconic Land Trust, Town of Southold, Suffolk County Parks, The Nature Conservancy, NYS Office of Parks, Recreation, and Historic Preservation, NYS Department of Environmental Conservation, U.S. Fish and Wildlife Service, and Cornell Cooperative Extension.

## **Conservation Strategies and Actions**

Conservation strategies for the OPPI IBA were developed using a modified version of The Nature Conservancy's Conservation by Design (<http://www.nature.org/aboutus/howwework/cbd/>) along with the Conservation Measures Partnership's Open Standards for the Practice of Conservation (<http://www.conservationmeasures.org>). A series of meetings were held with the conservation committee between September 2005 and March 2008. The purpose of these meetings was to identify and prioritize conservation targets, threats to those targets, and strategies to help address the threats. During the period of October 2008 to May 2009 the committee continued to meet to refine the conservation strategies, prioritize strategies based on need and opportunity, and begin implementation of selected conservation strategies within the IBA.

### ***Conservation Targets***

The Conservation Committee brainstormed priorities (conservation targets) to conserve and protect within the OPPI IBA. Initially the following targets were identified: Breeding and

feeding areas for beach nesting birds, including Piping Plover, Common Tern, Least Tern; Osprey; wintering waterfowl areas; old field habitat for wintering birds; saltmarsh habitat (focal species include Saltmarsh Sharp-tailed Sparrow and Seaside Sparrow); and maritime beach dune complex. The list was modified to five conservation targets to focus the effort.

### **Orient Point to Plum Island Conservation Targets**

- 1) Beach nesting birds and their habitats*
- 2) Wintering waterfowl*
- 3) Early successional habitat for breeding shrub birds*
- 4) Agricultural areas for wintering grassland birds*
- 5) Saltmarsh habitat*

The committee defined the conservation targets to identify the aspects of each target that, if missing or altered, would lead to the substantial loss of that target over time and its ability to persist in the long-term. This helped determine what was needed to measure and assess the status of each target. Definitions, measures, and knowledge needs for each of the five conservation targets are summarized in Table 2. The committee decided to gather information relative to the conservation targets before moving forward with identifying and prioritizing strategies (Appendix C).

**Table 2.** Definitions, measures, and knowledge needs of identified conservation targets for the Orient Point to Plum Island IBA.

<b>Conservation Target</b>	<b>Definition</b>	<b>Measure</b>	<b>Knowledge Needs</b>
<b><i>Beach nesting birds and their habitats</i></b> ( <i>Piping Plover, Common Tern, Least Tern, Roseate Tern, and Osprey</i> )	<ul style="list-style-type: none"> <li>• Necessary/essential breeding and migratory habitat: open, early successional habitat, sparse vegetation, distributed nesting habitat, platforms</li> <li>• Suitable habitat: beach use, and access to prey</li> <li>• Essential food: mud flats, fresh and salt water areas</li> </ul>	<ul style="list-style-type: none"> <li>• Breeding population size</li> <li>• Productivity</li> <li>• Breeding distribution</li> <li>• Migratory species and number of individuals</li> <li>• Length of migratory stay</li> <li>• Frequency of migration use</li> </ul>	<ul style="list-style-type: none"> <li>• Locations and number of nesting osprey, plovers, and terns.</li> <li>• Migratory counts and location/use of migratory habitats.</li> </ul>
<b><i>Wintering waterfowl</i></b> ( <i>American Black Duck, Canvasback, scaup spp., Long-tailed Duck, scoter spp., Bufflehead, Common Goldeneye, and Red-breasted Merganser</i> )	<ul style="list-style-type: none"> <li>• Suitable and essential habitat</li> <li>• Food</li> <li>• Shelter, lack of disturbance</li> <li>• Open areas</li> </ul>	<ul style="list-style-type: none"> <li>• Species and numbers of individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Number of waterfowl.</li> </ul>

<b>Early successional habitat for breeding shrub birds</b> <i>(Northern Harrier, American Woodcock, Blue-winged Warbler, Prairie Warbler, Willow Flycatcher, Northern Bobwhite, American Kestrel, Eastern Kingbird, Horned Lark, Brown Thrasher, Eastern Towhee, Field Sparrow, Indigo Bunting, Savannah Sparrow)</i>	<ul style="list-style-type: none"> <li>• Size</li> <li>• Plant species composition and structure</li> <li>• Habitat distribution</li> <li>• Landscape context</li> </ul>	<ul style="list-style-type: none"> <li>• Acreage of habitat</li> <li>• Inventory of plant community</li> <li>• Number and richness of target bird species in breeding season</li> </ul>	<ul style="list-style-type: none"> <li>• What exists--are areas supporting breeding species</li> <li>• List of priority species we are targeting</li> <li>• Requirements of priority species</li> <li>• Amount, size and distribution of habitat</li> <li>• Farm inventory includes approx 55 tax parcels, this includes all types of agriculture</li> </ul>
<b>Agricultural areas for wintering grassland birds</b> <i>(Horned Lark, Savannah Sparrow, Snow Bunting, Others?)</i>	<ul style="list-style-type: none"> <li>• Size</li> <li>• Plant species composition and structure</li> <li>• Habitat distribution</li> <li>• Landscape context</li> </ul>	<ul style="list-style-type: none"> <li>• Acreage of habitat</li> <li>• Number and richness of target bird species in winter season</li> </ul>	<ul style="list-style-type: none"> <li>• Winter species use of fallow fields on private farms in Orient.</li> </ul>
<b>Saltmarsh habitat</b> <i>(Salt-marsh Sharp-tailed Sparrow, Seaside Sparrow)</i>	<ul style="list-style-type: none"> <li>• Nutrient level</li> <li>• Salinity</li> <li>• Ability to migrate</li> <li>• Size</li> </ul>	<ul style="list-style-type: none"> <li>• Plant indicators</li> <li>• Presence of bird species</li> <li>• Amount of shoreline that would not allow for migration (e.g. roads, hardened, etc.)</li> <li>• Sediment structure</li> </ul>	<ul style="list-style-type: none"> <li>• Amount of habitat.</li> <li>• Seasonal differences in habitat availability and species use.</li> </ul>

### **Threats to Conservation Targets**

The committee identified and discussed a number of threats to each target (Table 3). These threats were then ranked as high, medium, or low by individual committee members and then as a group. Factors determining whether a threat received a ranking of high, medium, or low included its scope (proportion of the target that can be expected to be affected by the threat), severity (level of expected damage to the target given the continuation of current circumstances and trends), and irreversibility (degree to which the effects of the threat can be reversed and the target restored if the threat no longer existed). This led to a prioritization of threats for each of the conservation targets (Table 4).

**Table 3.** Threats to the conservation targets for the Orient Point to Plum Island IBA.

Conservation Target	Threats
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<b><i>Beach nesting birds and their habitats</i></b>	<ul style="list-style-type: none"> <li>• Direct human-caused mortality (intentionally killing or destroying nests)</li> <li>• Existing development (residential, municipal, and commercial)</li> <li>• Future development (residential, municipal, and commercial, developmental pressures)</li> <li>• Climate change (unusual weather patterns, sea level rise)</li> <li>• Incompatible recreation (unleashed dogs, fireworks, ORVs)</li> <li>• Pollution (garbage, oil spills)</li> <li>• Predation (e.g. feral cats, raccoons)</li> <li>• Sea-level rise</li> <li>• Shoreline hardening (beach erosion and dredging)</li> <li>• Succession (short-term and long-term needs, source of this threat needs to be addressed but is a longer-term effort, there may be short-term actions that can address it)</li> <li>• Energy development (Wind turbines)</li> </ul>
<b><i>Wintering Waterfowl</i></b>	<ul style="list-style-type: none"> <li>• Brown tide cause (need to know more)</li> <li>• Incompatible recreation (boat disturbance and illegal hunting)</li> <li>• Large scale aquaculture (potential)</li> <li>• Pollution (oil spills)</li> <li>• Energy development (potential, preliminary stages, will have to do full EIS)</li> </ul>
<b><i>Early successional habitat for breeding shrub birds</i></b>	<ul style="list-style-type: none"> <li>• Atmospheric deposition</li> <li>• Climate change</li> <li>• Existing development</li> <li>• Farming practices</li> <li>• Fire suppression/exclusion</li> <li>• Future development</li> <li>• Invasive species</li> <li>• Motor-powered recreation</li> <li>• Habitat fragmentation (right of ways, roads, utility/power lines)</li> <li>• Succession</li> <li>• Deer (browsing, habitat/vegetation destruction)</li> </ul>
<b><i>Agricultural areas for wintering grassland birds</i></b>	<ul style="list-style-type: none"> <li>• Existing development</li> <li>• Farming practices</li> <li>• Future development</li> <li>• Invasive species</li> </ul>
<b><i>Saltmarsh habitat</i></b>	<ul style="list-style-type: none"> <li>• Existing development (septic systems, pesticides, lawn fertilizers, filling, lack of buffers)</li> <li>• Future development (septic systems, pesticides, lawn fertilizers, filling, lack of buffers)</li> <li>• Climate change (sea level rise)</li> <li>• Incompatible mosquito control</li> <li>• Incompatible recreation (wakes, jet skis, boaters)</li> <li>• Invasive species</li> <li>• Navigational dredging (cause marsh to slump, but not much happening within IBA)</li> <li>• Pollution (agricultural run-off, road run-off, residential)</li> <li>• Shoreline hardening</li> </ul>

**Table 4.** Priority threats to conservation targets for the Orient Point to Plum Island IBA.

<b><u>Beach nesting birds and their habitats</u></b> <ol style="list-style-type: none"><li>1. Predation (Orient Beach State Park, Plum Island)</li><li>2. Incompatible Recreation (Orient Beach State Park)</li><li>3. Future Development (Plum Island)</li></ol>
<b><u>Wintering waterfowl</u></b> <ol style="list-style-type: none"><li>1. Pollution</li><li>2. Incompatible Recreation</li></ol>
<b><u>Early successional habitat for breeding shrub birds</u></b> <ol style="list-style-type: none"><li>1. Habitat Fragmentation</li><li>2. Invasive Species</li></ol>
<b><u>Agricultural areas for wintering grassland birds</u></b> <ol style="list-style-type: none"><li>1. Future Development</li><li>2. Farming Practices</li></ol>
<b><u>Saltmarsh habitat</u></b> <ol style="list-style-type: none"><li>1. Invasive Species</li><li>2. Climate Change</li></ol>

#### ***Strategies to Address Threats to Conservation Targets***

During the winter and spring of 2009, the committee met to brainstorm strategies to address threats to conservation targets, prioritize those strategies based on need and opportunity, and discuss involvement of the committee and member organizations in addressing the priority strategies. Based on the priority threats to conservation targets identified, the strategies prioritized by the committee for each of the conservation targets are listed below.

##### **Priority strategies for beach nesting birds and their habitats**

- Ensure the plover/tern sites at Orient Beach State Park and Plum Island are monitored regularly throughout the season effective April 1<sup>st</sup> each year.
- Reduce the threat of nest and chick predation for priority bird species through predator management.
- Selectively control documented predators at sites with high predation rates (removal of raccoons, gulls, etc.).
- Become involved in the potential transition of Plum Island—write a letter to USDA expressing interest in seeing it preserved, identify potential land protection partners who may be interested in acquisition, identify potential funds (e.g., EPF, LISSA) for acquisition. Work with the Town of Southold to ensure zoning of Plum Island protects critical habitats.

##### **Priority strategies for wintering waterfowl**

- Reduce the threat of nonpoint source pollution and solid waste to priority species and their habitats through policy and management.

#### Priority strategies for early successional habitat for breeding shrub birds

- Identify focus areas within the IBA for these habitats and species thru surveys being conducted and work to maintain them as productive habitat. This could be achieved through management and/or land protection via town zoning or working with land protection partners (such as Town/County/State/TNC/PLT) to preserve land and mitigate future development.

#### Priority strategies for agricultural areas for wintering grassland birds

- Identify focus areas within the IBA for these habitats and species thru surveys being conducted and work to maintain them as productive habitat. This could be achieved through management and/or land protection via town zoning or land protection partner.

#### Priority strategies for saltmarsh habitat

- Determine extent of habitat within IBA and conduct monitoring to detect presence/occurrence of target species.
- Reduce the threat of adverse habitat modification and altered plant community composition from increased prevalence of invasive species.
- Become aware of activities that other groups are doing at a larger scale to assess and address climate change and rising sea level and see if there are ways we can assist at the local scale (e.g., the Eastern States Alliance group work, Sea Level Rise Task Force; monitoring or other activities may be a part of those efforts).

#### ***Next Steps***

In the Spring of 2009, the committee met to determine capacity of member organizations to address priority conservation strategies as well as the committee's role moving forward. It was determined that the committee was already moving forward with addressing some of the priority strategies while other strategies were not feasible to address at this time. Current activities by the committee to address priority strategies include:

- Audubon New York and US FWS have been working with US DHS and NYS OPRHP to conduct regular weekly monitoring of beach-nesting bird activity throughout the breeding season at Orient Beach State Park and Plum Island beginning in April of 2009.
- Predator exclosures were used in the 2009 breeding season to protect Piping Plover nests at Orient Beach State Park and Plum Island.
- USDA trapped and removed raccoons from Plum Island in 2008.
- Audubon New York and North Fork Audubon have identified agricultural habitat for wintering grassland birds in Orient and have conducted a first round of bird surveys at these sites in Winter 2009.
- Audubon New York, US FWS, and The Nature Conservancy have identified saltmarsh habitat within the IBA. Site visits in June 2009 have confirmed use of saltmarsh habitat by Saltmarsh Sharp-tailed Sparrows.
- Audubon New York and North Fork Audubon continue to work with US DHS to conduct bird surveys on Plum Island.

In the case where the timing was not appropriate for the committee to address particular strategies, the group agreed to monitor the events and progress of other stakeholders in addressing these strategies. For example, the committee feels that it is important for us to be

involved in the potential transition of Plum Island. However, the closure of the facility on Plum Island has not yet been finalized and so there are not any actions for the committee at this time other than to monitor the situation so that we can become involved if the transition is announced.

### ***Conclusions***

The Orient Point to Plum Island IBA is a site of statewide significance because of the habitat it provides to birds, specifically breeding at-risk birds and congregations of terns and waterfowl. To facilitate conservation and increase awareness of the site's significance, a group of interested individuals from a variety of organizations participated in a series of meetings to develop this conservation action plan. Although this report summarizes the work carried out to date, the strategies and actions outlined in this report will require long-term commitment on behalf of those who have been involved in this effort and could involve other conservation partners.

## **Appendix A**

### **Long Island Sound Stewardship Act**

The Long Island Stewardship Act was passed by the House on Sept. 18, 2006 and the Senate on Sept. 20, 2006 and the president signed the bill on October 16, 2006. The measure would authorize up to \$25 million annually through 2011 to preserve and improve open spaces and important ecological sites around the Sound, as well as to provide additional access to this nationally significant estuary. Thirty-three initial priority sites have been identified by the LIS Study Policy Committee, including Plum Island. Orient Point has not been identified in this list, but is within the Peconic Estuary, which would make it eligible for funding under the Act.

The bill was amended several times since its introduction to both houses in June 2004. One of the amendments in 2005 added the Peconic Estuary as part of the larger Long Island Sound region. This would allow for grants from this bill to be used in furtherance of the Peconic CCMP which was issued in 2001. Other changes reduced the authorized funding level from \$40 million annually to \$25 million, and the federal to local match from 75%-25% to 60%-40%. The sunset term was reduced from Dec. 31, 2013 to Dec. 31, 2011. There were many other small changes and some more troubling amendments, including the definition of a qualified applicant. Hopefully, many of the concerns will be resolved when the guidelines and criteria are established pursuant to the terms of the bill.

## **Appendix B**

### **Relevant reports and other sources of information**

Orient, New York. (2006, November 19). In *Wikipedia, The Free Encyclopedia*. Retrieved 20:00, December 19, 2006, from [http://en.wikipedia.org/w/index.php?title=Orient%2C\\_New\\_York&oldid=88743524](http://en.wikipedia.org/w/index.php?title=Orient%2C_New_York&oldid=88743524)

An Island Fortress for Biosecurity. USDW Research and the Plum Island Animal Disease Center. Retrieved 16:50, December 19, 2006, from <http://www.ars.usda.gov/plum/forum1295.htm>



## Appendix C

### Resources for addressing identified knowledge needs related to conservation targets for the OPPI IBA.

Target	Knowledge Needs	Resources
<b>1) Beach-nesting birds and their habitats.</b>	Locations and number of nesting osprey, plovers, and terns.	LICWS data (1994 – 2007) for Orient Beach State Park and Plum Island. NYS Natural Heritage Program data. NFAS Osprey Census data and nest stand locations (2006 and 2007). NYS DEC Osprey surveys.
	Migratory species counts and location/use of migratory habitats.	Plum Island surveys.  eBird
<b>2) Wintering waterfowl.</b>	Number of waterfowl.	eBird Plum Island surveys (1/25/07, 3/5/07, 11/27/07). CBC surveys (1994 – 2006).
<b>3) Early successional habitat for breeding shrub birds.</b>	What exists? Are areas supporting breeding species?	Plum Island surveys (6/27/07, 7/13/07, 6/19/08, 7/5/08). Breeding Bird Surveys (beginning Spring 2009)? eBird Habitat map using orthophotos, PEP and Southold Town land cover GIS data.
	List of priority species we are targeting.	NYS and federally listed species. Audubon WatchList 2007. Partners in Flight assessment of species of concern/stewardship 2005. NYS Breeding Bird Atlas.
	Requirements of priority species.	Literature review. Audubon New York Science office.
	Amount, size, and distribution of habitat.	Habitat map using orthophotos, PEP and Southold Town land cover GIS data.
	Farm inventory includes approx 55 tax parcels, this includes all types of agriculture.	Habitat map using orthophotos, PEP and Southold Town land cover GIS data.
<b>4) Agricultural areas for wintering grassland birds.</b>	Winter species use of fallow fields on private farms in Orient.	eBird Winter Surveys (beginning Winter 2008 – 2009)? CBC surveys (1994 – 2006).

<b>5) Saltmarsh habitat.</b>	Amount of habitat.	Habitat map using orthophotos, PEP and Southold Town land cover GIS data.
	Seasonal differences in habitat availability and species use.	eBird Habitat map using orthophotos, PEP and Southold Town land cover GIS data.

# Orient Point and Plum Island

## Southold, Suffolk County

10,000 acres  
0-100' elevation

41.1423°N  
72.2713°W

### IBA Criteria Met

Criterion	Species	Data	Season	Source
Species at Risk	Piping Plover	1 pair in 2002, 1 in 2001, 7 in 1998, 6 in 1997, 9 in 1996, 5 in 1995, 8 in 1994, 5 in 1993	Breeding	NY Natural Heritage Biodiversity Databases
Species at Risk	Common Tern	At least 40 nesting pairs	Breeding	Mike Wasilco pers. comm. 2004
Species at Risk	Least Tern	27 pairs in 1998, 16 in 1997, 108 in 1996, 23 in 1995, 16 in 1994, 48 in 1993	Breeding	NY Natural Heritage Biodiversity Databases
Congregations- Waterbirds	Terns	300+ Common and Roseate Terns courting and fishing in the area between Plum Island and Orient Point	Breeding and migration	Mike Wasilco pers. comm. 2004

**Description:** This site includes land and water on the North Fork of Long Island, extending from Orient Harbor to Plum Island and including Orient Beach State Park. Between Orient Point and Plum Island lies Plum Gut, a deep open water channel that links the waters of Gardiners Bay with the waters of eastern Long Island Sound. The habitats of particular significance to birds and other wildlife include barrier beaches, salt marshes, shallow bays, and maritime forests. Plum Island has a mixture of rocky shoreline, sand beaches, wetlands, and various upland shrub, grassland, and forest habitats. Several regionally rare plant species occur here, including Scotch loveage (*Ligusticum scothicum*), slender knotweed (*Polygonum tenue*), and sea-beach knotweed (*Polygonum glaucum*). A stand of blackjack oak (*Quercus marilandica*) represents the northernmost extent of the range of the species. Orient Harbor supports a significant bay scallop (*Aequipecten irradians*) commercial shellfishery and is an important spawning, nursery, and feeding area for a variety of fish. The offshore waters, especially of Plum Gut, host large concentrations of striped bass (*Morone saxatilis*), bluefish (*Pomatomus saltatrix*), tautog (*Tautoga onitis*), summer flounder (*Paralichthys dentatus*), and others. Plum Gut is a major migration corridor for striped bass and Atlantic salmon (*Salmo salar*).

## Birds:

Colonial breeding birds documented here during the 1995 NYS DEC LICWPP survey included Great Egrets (18 pairs), Snowy Egrets (five pairs), Black-crowned Night-Herons (14 pairs), Piping Plovers (five pairs), American Oystercatchers (five pairs), Herring Gulls (2,608 pairs), Great Black-backed Gulls (1,691 pairs), and Least Terns (23 pairs). There were also 27 pairs of Double-crested Cormorants. Plum Gut, between Orient Point and Plum Island, is a nutrient-rich upwelling that is an important feeding area for Roseate and Common Terns from the nearby Great Gull Island colony. Ospreys nest and forage in the marshes here, and the area is an important waterfowl wintering area with substantial numbers of Canada Geese, American Black Ducks, Mallards, Canvasbacks, scaup, Long-tailed Ducks, scoters, Buffleheads, Common Goldeneyes, and Red-breasted Mergansers.

## Conservation:

This site is listed in the 2002 Open Space Conservation Plan as a priority site under the project name Long Island Sound Coastal Area. Intensive management efforts are needed to eliminate or minimize human disturbance and intrusions into nesting colonies of terns and Piping Plovers at Orient Point during the critical nesting season (mid-April to August). Means to accomplish this include fencing, beach closures, posting, beach warden patrols, and public education. In those colonies where predation is a significant problem, whether from pets, feral animals, or native species such as raccoons or gulls, predator control programs should be undertaken. NYS OPRHP should continue its stewardship program for Piping Plovers in cooperation with The Nature Conservancy. Management plans should be developed and implemented by state, town, and private conservation groups. Increased development of the shoreline in the Orient Harbor area could degrade water quality and the suitability of these waters and habitats. Monitoring of at-risk species and waterfowl is needed.